DOCUMENT RESUME

ED 286 750 SE 048 590

TITLE	Applied Academics. Applied Mathematics: Drafting. Curriculum Bulletin VE-53.
INSTITUTION	Cincinnati Public Schools, OH. Div. of Student Services.
PUB DATE	86
NOTE	206p.
AVAILABLE FROM	Cincinnati Public Schools, 230 E. Ninth St., Cincinnati, OH 45202.
PUB TYPE	Guides - Classroom Use - Guides (For Teachers) (052) -- Reports - Descriptive (141)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Algebra; *Course Descriptions; *Drafting; Educational Objectives; Geometry; *Grade 11; *Grade 12; High Schools; Integrated Activities; *Mathematics Curriculum; *Mathematics Instruction; Secondary School Mathematics; Student Evaluation; Vocational Education
IDENTIFIERS	*Ohio (Cincinnati)

ABSTRACT

This publication contains the Applied Mathematics Curriculum (Drafting) for grades 11 and 12 for the Cincinnati (Ohio) Public Schools. The curriculum is part of a larger program (the Applied Academics Program), which emphasizes the integration of mathematics and the language arts with vocational content. Included in the document is a description of the Applied Academics Program (including its philosophy, goals, and evaluation policy), the Applied Mathematics Program--Junior Year (including its philosophy, goals, and objectives), the Applied Mathematics Program--Senior Year (including its philosophy, goals and objectives). The curriculum outlines include vocational student objectives and student activities and related academic student objectives and student activities. The appendices contain evaluation instruments and forms. (RH)

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APPLIED ACADEMICS DRAFTING

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APPLIED MATHEMATICS

BRANCH OF VOCATIONAL/
CONTINUING EDUCATION
DEPARTMENT OF STUDENT SERVICES
CINCINNATI PUBLIC SCHOOLS

CURRICULUM BULLETIN VE-53
COURSE OF STUDY

SE 048 590

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STATEMENT OF APPROVAL

Pursuant to all requirements of the Ohio State Department of Education, the course of study contained in this manual has been developed and approved by the Cincinnati Public Schools for use in:

Subject: Applied Mathematics - Algebra and Geometry

Grade(s) 11 - 12

School: Cincinnati's Comprehensive High Schools

Board of Education Approval: September 1985-September 1986

APPLIED MATHEMATICS

DRAFTING

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ACKNOWLEDGEMENTS

1984

Grateful appreciation is expressed to the teachers who wrote and implemented the original project - William Baker, Paul Horn, Hope Lieberman, Kenneth Skirtz and Kathleen Ware.

The VETIP project was completed under the coordination and supervision of Dennis P. Miller, Supervisor of Trade and Industry, under the direction of Vera M. Ramstetter, Associate Director of Vocational Education, and under the general direction of T. R. Herklotz, Director of Vocational-Continuing Education, and Willis Holloway, Assistant Superintendent.

1985-1986

The project now continues, broadened and expanded, under its new name, Applied Academics; and more specifically, Applied English and Applied Mathematics. For the additional writing and revision, we gratefully acknowledge Ronald Hartzel, Joseph Heink, Everett Newman, Albert Paddock, Kenneth Skirtz, Ronald Smith, Kathy Witherup, Donella Hess, Maridee Kessen, Ruth Robinson, Della Wiles, Nora Walton, Sue Raudabaugh, Theresa Penn, Gary Louis and Samuel Witherup. The editing was done by Betty Ottesen.

APPLIED ACADEMICS PROGRAM

INTRODUCTION

Background

During the 1983-84 school year, VETIP (Vocational Education Target Intervention Program) was piloted at Withrow High School in the carpentry and construction electricity classes. Three curricula - mathematics, language arts, and the vocational - were interrelated so that what the student learned in one was reinforced in the other two. Vocational students became used to receiving assignments to do written research projects from their vocational teacher. They carried models constructed in the vocational laboratory into their English class. Their mathematics teacher gave writing assignments.

The basic premises of this model program were as follows: - instruction in language arts and reading is more effective if it is related to vocational content and is given either immediately before or at the same time as that content is taught by the vocational teacher; evidence of personal interest and concern from the teacher affects students' academic achievement; students who are actively involved in learning are more successful in school; the coordinated effort of teachers, counselors, and administrators is necessary to effect changes in the learning environment that will enable a significant number of pupils to successfully complete their secondary education.

In 1984-85 VETIP was implemented by a team of teachers, a counselor, and administrators. Counselors optioned students from VETIP vocational classes into VETIP language arts classes. All of the students from one vocational class, except those who were in advanced placement English, constituted one language arts class. The class stayed together for four periods each day (a three-hour vocational class plus one period of language arts).

Applied Academics Today

The project being implemented currently follows these same guidelines, though expanded to include mathematics as originally intended. Its name speaks its purpose and chief emphasis - applied academics.

The teaching team is primarliy comprised of the math teacher, the English teacher and the vocational teacher. Administrators and counselors are support persons in the main drama.

The central person on the team is the vocational teacher, and it is his/her responsibility to coordinate the activities of the team. Before each unit of instruction in the vocational class, this teacher gives to the academics teachers a Unit Communication Form (see Form B) which provides them with the information they need to give related instruction.

For each student, the vocational teacher keeps on file a folder containing the following information: class schedule, diagnostic test information (see Form C), Student Profile, if issued, (see Form A) and the Student Evaluation Sheet (see Form D).

At the end of each term, the teachers meet to assess the progress of each student and to complete the specified sections of the Student Evaluation Sheet. At other times, the teachers informally confer so that each one is constantly informed of individual student progress in both the affective and cognitive domains.

Classroom Atmosphere

One of the basic premises of this program is that the learning environment provided by the teacher greatly affects students' achievement. The teacher's general manner usually sets the tone for the class. A pleasant expression, neat appearance, and a command of authority let the student know that there is a job to do.

Effective use of authority is one of the most difficult concepts to master. The heavy-handed autocratic teacher might succeed in holding the forces in line, but the environment he/she provides is usually not one where students feel comfortable. At the other extreme is everyone's pal, the teacher who takes a peer approach to students. The environment provided by this teacher is usually so free that students do not sense any direction in their learning.

Somewhere between these two is the professional and caring teacher in the role of manager of a positive learning environment. Calmness, concern, firmness, and consistency are characteristics of this teacher. He/she starts each class promptly with a motivating activity. Mundane beginnings with such activities as roll call tell the student that the teacher is not terribly interested in or certain about what is going to occur in class.

From the beginning to the end of class, the effective teacher has a clear plan of the learning activities in which the students are to be engaged. Long lectures and question-answer discussions where the teacher asks the questions and three or four students provide all of the answers do not keep interest alive. Passive listeners soon get bored and listless.

This teacher also finds time to talk individually with students. He/she lets the student know that there is a cooperative effort among Applied Academics team members to help him/her succeed in school.

Frequent contacts are made with the student's parents. Home visits are recommended. As one way of exploiting the student's strengths, the teacher contacts the parents to congratulate them on something good that their child has done. Frequently, the only contact teachers have with parents concerns some negative aspects of the child's behavior.

Efficient management of the daily routine of any class sets a business-like atmosphere conducive to learning. Systems for checking out tools, using the restroom and going to lockers are developed so that each request does not call for a decision by the teacher. Consistency, fairness and a set pattern usually remove these kinds of activities from the realm of potential conflict and disruption.

Rotation of responsibilities among students is important in a vocational class. Each student needs ample opportunity to experience responsibility in a number of situations during the course of the year. For instance, this week's tool room supervisor may be next week's crew foreman.

Students quickly sense that the teacher is in control of the environment and sincerely cares about what happens to them. Even though poor behavior must be dealt with, the effective teacher focuses attention on students' acceptable behavior. Praise is given in a genuine manner. Students' strengths are used as the bases for learning.

The success of the Applied Academics Program is directly related to the environment provided by the teacher. The teacher must make the students feel that they are part of the class and that they can succeed in school.

Directions for Use of Course of Study

Part II of this course of study contains the curriculum for the vocations, English, and mathematics. These have been written during the summers of 1983, 1984, 1985 and 1986. They are subject to revision as the New Courses of Study for English and Mathematics are adopted and as users give further input. All curricula follow approved graded courses of study for the appropriate subject area.

One of the premises of the program is that mathematics and language arts instruction should be related to vocational content and given at about the same time as that content is taught. Therefore, there are columns for those teachers. In the English Activities column, suggetions for teaching vocabulary, both technical and non-technical, are given. The vocational teacher lists the words for the unit on the Unit Form and gives it to the English teacher.

Reading skills needed in comprehending the specified sections of the text are also listed in this column. These are the same reading skills taught in any class, but here they are taught using the vocational material as the context. Practice writing exercises are included at relevant points in the curriculum.

In the column titled Math Activities, areas of mathematics covered in the vocational unit are listed. The vocational teacher gives the mathematics teacher a more specific listing on the Unit Form. The instruction given by the mathematics teacher in basic computational skills is based on diagnostic test results. However, in teaching these basics, the mathematics teacher uses examples that are relevant to the content being studied in the vocational program. For instance, in learning to figure area, the student may determine how many twelve-inch square tiles are needed to cover a kitchen floor that is ten feet by twelve feet.

The English and mathematics teachers use this program to relate basic skill instruction to content instruction and to combine their teaching when possible. Reading graphs and working word problems are areas that call for reading and mathematical skills. The teachers may elect to team teach or in some other way supplement each other's work.

The forms included in this program are not intended to make the teacher's paperwork more cumbersome but to ease the transfer of information among teachers who are working toward a common goal -- students' success in their vocational program. Individual teachers may develop better methods of involving students in the learning process, more exciting motivating activities, more creative approaches to teaching the units. The daily lesson plans of two carpentry teachers using the program may differ in activities but should be similar in that they reflect the premises of this program and the coordination of effort among the support team.

Each teacher's effectiveness related to the vocational student is evaluated in terms of the student's achievements, attendance, number of discipline referrals, and overall adjustment to school. All people working on the team are responsible for the model's effectiveness.

District Philosophy of the Cincinnati Public Schools

The purpose of the Cincinnati Public Schools shall be the perpetuation and improvement of the democratic way of life. To this end, the schools shall strive to develop in children the knowledge, skills, habits, understanding, attitudes, and character traits essential for rich personal living, for sound choice of and effective participation in a vocation, for noble and satisfying human relationships, and for responsible, contributing citizenship. Important among the outcomes to be achieved are staunch moral character and appreciation of spiritual values; love of home and country; respect for duly constituted authority; genuine concern and thoughtful consideration for the welfare and rights of others regardless of race or creed; willingness to act in the interest of the general welfare; disciplined approach to the varied responsibilities of life; and the desire ever to improve in those competencies essential to effective personal and social living.

Realizing fully the great responsibility of the schools of the community in the pursuit of these objectives and outcomes, the Board of Education believes they can be satisfactorily achieved only with the full cooperation and support of all agencies of community life that share responsibility for the welfare and development of children and youth. Among these, the responsibility of the home is primary. The development, therefore, of close relationships with these agencies, and in particular, a home-school partnership of responsibility and effort, is a principle aim of the schools.

The superintendent shall, from time to time, with the advice and consent of the Board of Education, prepare statements of specific objectives consistent herewith, and these statements shall serve as the basis for determining the curriculum and instructional practices of the schools and for evaluating their effectiveness.

APPLIED ACADEMICS

PROGRAM PHILOSOPHY

We believe that three curricula - mathematics, English and the vocational content - can be interrelated so that what the student learns in one class can be reinforced in the other two.

We believe in the following basic premises: instruction in communication skills and math is more effective if it is related to vocational content and is given either immediately before or at the same time as that content is taught by the vocational teacher; evidence of personal interest and concern from the teacher affects students' academic achievement; students who are actively involved in learning are more successful in school; the coordinated effort of teachers, counselors and administrators is necessary to effect changes in the learning environment that will enable a significant number of pupils to successfully complete their secondary education.

We believe that the learning environment provided by the teacher greatly affects students' achievement. The teacher's general manner usually sets the tone for the class. A pleasant expression, neat appearance, and a command of authority let the student know that there is a job to do. Effective use of authority is one of the most difficult concepts to master. A positive learning environment will be established through calmness, concern, firmness and consistency. Efficient management of the daily routine of any class sets a business-like atmosphere conducive to learning.

We believe that a team effort among the three teachers provides the students with coordinated/related instruction and a network of support which actively involves them in learning, thereby motivating the student to achieve. The team members meeting on a regular basis to interact, plan and implement the course of study/curriculum help create the desirable climate.

We believe that the most effective approach to teaching the vocational applied academic skills is an integrated one. This instructional approach is most effective when it is:

- built upon student experineces
- developed within the context of the language used by students
- used in real and life situations

APPLIED ACADEMICS

PROGRAM GOALS

I. The Vocational Applied Academics Program will provide lesson plans with the vocational content as the core of the integrated English and mathematics skills. Therefore, all skills will be taught with the vocational content as the basis.

II. The Vocational Applied Academics Program will provide continued opportunities to develop listening, speaking, observing, reading, composition, and writing skills.

III. The Vocational Applied Academics Program will provide continued opportunities to develop logical thought, sequencing, computational mathematics and theoretical mathematics skills.

IV. The Vocational Applied Academics Program will provide assessment of student progress in both the affective and cognitive domains.

APPLIED ACADEMICS

PUPIL EVALUATION POLICY

An evaluation of students' cognitive growth in the Vocational Applied Academics Program can be assessed through a variety of regular classroom procedures. The methods used should be ongoing, collective, progressive, relevant and valid. The Student Profile Form will be an ongoing "case study" collection instrument.

In the vocational area, student success can be measured through objectives written/oral tests, daily class participation, observation of completed tasks, checklists of duties or specific skills, and the actual performance of tasks required.

In the academic areas, student skill growth can be assessed through objective testing, spoken and written use of language, compositions, projects, daily classroom participation, speeches, panel discussions, reports, essay tests, and defining/explaining mathematical procedures or axioms.

To meet districtwide testing requirements for the competency based education in reading, writing and mathematics, standardized tests, CIMS and writing samples will be used.

The evaluation of the students' affective growth will be assessed through attitude scales, quarterly evaluation by teachers, conference recording and group rating forms.

APPLIED ACADEMICS

MATHEMATICS

THE APPLIED MATHEMATICS OBJECTIVES AND ACTIVITIES FOR EACH VOCATIONAL CONTENT AREA ARE TO BE INTEGRATED INTO THE GRADED COURSE OF STUDY AND THE CURRICULUM BULLETINS ADOPTED BY THE CINCINNATI PUBLIC SCHOOLS.

APPLIED ACADEMICS

MATHEMATICS

PROGRAM PHILOSOPHY

Mathematics is a growing body of information and a set of processes. It originates in the world of reality, is abstracted, and formalized into a logical system of facts, concepts, and rules. It is used to describe the quantitative and spatial aspects of the world, and as a tool in problem solving, scientific investigation, and technological development. All people use mathematics to some extent in their daily lives.

The Applied Academics Mathematics Program in the Cincinnati Public Schools is designed to enable all pupils to learn mathematics and achieve skill with its use in order to reach their full potential and to cope with the quantitative and spatial aspects of their environment.

Mathematics is to be taught so that pupil self-image is enhanced and good attitudes toward mathematics are developed. Instructional strategies and content are to be selected in accordance with knowledge of child development and learning theory. Manipulative materials, readiness activities, instruction aids, and realistic applications related to the vocational content are used. Ideally, mathematics will be viewed by the learner as a meaningful activity having many applications and not merely as a mental discipline. All areas of mathematics are more easily grasped when they are applied to practical daily and vocational applications in problem solving.

The goals in this program include more than computation. Daily use of such skills as estimating, problem solving, interpreting data, organizing, measuring, and especially applying mathematics to vocational situations is essential if students are to master the basic mathematical competencies needed for daily living and on the job.

APPLIED ACADEMICS

MATHEMATICS

PROGRAM GOALS

The goals of the Applied Academics - Mathematics Program of the Cincinnati Public Schools are to provide each student with the opportunity to master the following skills.

As related to an identified vocational area, the student should be able to:

A. acquire basic skills in obtaining information, solving problems, thinking logically, critically, and communicating effectively

B. acquire the knowledge, skills, and understanding that permit him/her to play satisfying and responsible roles as both producer and consumer

C. acquire job entry-level skills and, also, to acquire knowledge necessary for further education

D. develop a positive self image, abilities and potentialities

APPLIED MATHEMATICS

ALGEBRA I

PROGRAM OBJECTIVES

I. Real Numbers

A. The program provides opportunities to simplify and evaluate numerical expressions

B. The program provides opportunities to compare real numbers on a number line

C. The program provides opportunities to add, subtract, multiply, and divide real numbers

II. Equations

A. The program provides opportunities to use several transformations to solve equations

B. The program provides opportunities to use problem-solving strategies to solve problems involving cost and value

III. Polynomials

A. The program provides opportunities to add, subtract, multiply, and divide polynomials

B. The program provides opportunities to transform formulas

C. The program provides opportunities to use problem-solving strategies to solve distance and area problems

D. The program provides opportunities to find the product of two binomials mentally

E. The program provides opportunities to find the factors of a simple polynomial

IV. Rational Expressions

A. The program provides opportunities to simplify, add, subtract, multiply, and divide algebraic fractions

B. The program provides opportunities to use ratio and proportion

C. The program provides opportunities to solve fractional equations

D. The program provides opportunities to use problem-solving strategies to solve percent, mixture, and work problems

E. The program provides opportunities to use negative exponents

V. Linear Equations and Functions

A. The program provides opportunities to graph ordered pairs and linear equations in two variables

B. The program provides opportunities to solve systems of linear equations

C. The program provides opportunities to use problem-solving strategies to solve, wind, water current, digit, age, and fraction problems

D. The program provides opportunities to graph linear and quadratic functions

E. The program provides opportunities to use variation

VI. Inequalities

A. The program provides opportunities to solve and graph inequalities in one variable

B. The program provides opportunities to use problem-solving strategies to solve problems involving inequalities

C. The program provides opportunities to graph linear inequalities in two variables

VII. Using Radical Expressions

A. The program provides opportunities to find decimal approximations to irrational square roots

B. The program provides opportunities to simplify, add, subtract, multiply, and divide radical expressions

C. The program provides opportunities to use the Pythagorean Theorem

D. The program provides opportunities to solve radical equations

E. The program provides opportunities to solve quadratic equations

APPLIED MATHEMATICS

SUBJECT OBJECTIVES

A. Real Numbers

The student will:

1. use order of operations to simplify numerical expressions which involve indicated arithmetic operations, powers, or grouping symbols
2. change word descriptions to mathematical expressions and equations
3. define integer, rational number, and real number and discuss the properties of the real numbers
4. use opposites and absolute value
5. show the order of real numbers
6. use the addition, multiplication, and equality axioms to simplify expressions
7. add, subtract, multiply and divide real numbers

B. Equations

The student will:

1. solve equations using addition or subtraction
2. solve equations using multiplication or division
3. use several transformations to solve equations
4. use charts to arrange facts in problems
5. solve problems involving cost and value

C. Polynomials

The student will:

1. simplify exponential expressions
2. identify algebraic expressions as monomials, binomials, trinomials, or polynomials

3. determine the degree of the polynomial
4. find powers of a monomial
5. transform formulas
6. solve problems involving uniform motion
7. solve problems involving area
8. factor integers
9. find a monomial factor of a polynomial
10. find the product of two binomials mentally
11. find the factors of a simple polynomial
12. use factoring to solve polynomial equations

D. Rational Expressions

The student will:

1. simplify algebraic expressions
2. fund the product and quotient of two algebraic expressions
3. express algebraic fractions with their common denominators
4. find the sum and difference of two algebraic expressions
5. use ratios and proportions to solve problems
6. solve equations with fractional coefficients
7. solve problems involving percents
8. solve mixture problems
9. solve work problems
10. use scientific notation
11. use negative exponents

E. Linear Equations and Functions

The student will:

1. solve linear equations in two variables given specific replacement sets
2. graph orderedpairs and linear equations in two variables
3. determine the solution set of a system of two linear equations by graphing, linear combination, or substitution
4. use systems of equations to solve wind, water current, digit, age, and fraction problems
5. find the slope and y-intercept of a line
6. find the equation of a line given its slope and y-intercept, its slope and a point on the line, or two points on the line
7. use function notation
8. graph linear and quadratic functions
9. use direct, inverse, joint, and combined variation to solve problems

F. Inequalities

The student will:

1. solve and graph inequalities in one variable
2. solve problems that involve inequalities
3. graph linear inequalities in two variables

G. Using Radical Expressions

The student will:

1. express rational numbers as decimals or fractions
2. simplify rational square roots
3. find decimal approximations to irrational square roots
4. simplify radical expressions
5. use the Pythagorean Theorem
6. add, subtract, multiply, and divide radical expressions
7. solve equations involving radical expressions
8. solve quadratic equations with real roots by factoring, by completing the square, or by use of the quadratic formula

The following Algebra I essential skills are to be taught throughout the Drafting I curriculum. Although the math is applied to the vocational content, the math teacher will also be teaching the following skills.

ALGEBRA I

ESSENTIAL SKILLS

1. Write an algebraic expression for a word phrase.
2. Apply the correct order of operations to simplify algebraic expressions.
3. Use linear equations to solve problems.
4. Use problem-solving strategies in new or unfamiliar situations.
5. Make realistic interpretations of the answers to real-life problems.
6. Factor a general trinomial.
7. Add, subtract, multiply or divide expressions containing square roots.
8. Find the sum or difference of two polynomials.
9. Solve quadratic equations with real roots by factoring, by completing the square, or by use of the quadratic formula.
10. Graphically demonstrate the concept of slope.
11. Graph equations and inequalities in one variable.
12. Write the equation of a line given conditions: slope and intercept, point and slope or two points.
13. Solve a system of two linear equations by graphing linear combinations or substitution.

APPLIED ACADEMICS

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11TH GRADE CURRICULUM

The following instructional activities are divided by grade level and are intended to assist you in teaching the objectives in the graded course of study. As supplements to the activities, instructional information is given in the introduction, philosophy and goals sections at the beginning.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
ORIENTATION Time Allotment: Days 1-5 Upon completion of the unit the student should be able to: examine course outline. discuss drafting as profession. practice fire and tornado procedure. discuss classroom and lab safety. prepare notebook and copy junior year outline. complete book cards abd individual student information sheets. show the benefits of joining VICA. review grading policy, progress charts and academic expectations.	Students will: - read student handbook. - understand safety rules and procedures. - organize a notebook. - write letter home. - fill out emergency information. - display VICA materials. - listen to former students. - learn all students names. - use progress chart. - develop study habits. - be introduced to special programs (i.e. Partners Education, Jobs for Cincinnati Graduates). - discuss students priorities such as: ...VICA membership ...school procedures. - study drafting machine. - do equipment inventory. - discuss personal habits including drug and alcohol abuse.	Students will: - study math course outline. - review parts of textbook Practical Mathematics, and be able to use table of contents, index, appendix, and answer guide. - receive an overview of course expectations such as home-work tests, grading procedures. - hear a guest speaker who will articulate the uses of math in Mechanical Drawing. - view film or video of "Donald Duck in Math Magic Land" (#499). -*review vocabulary and functions of components of drafting tools and write a simple paragraph describing why math is necessary to operate equipment. - take all diagnostic tests. *Must be coordinated with drafting teacher.	Upon completion of the unit, the students should be able to: understand math course expectations. describe mathematical applications in Mechanical Drawing. articulate the procedures for school, classroom, assignment completion. complete all diagnostic testing.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
LETTERING Time Allotment: Days 6-9 Upon completion of the unit the student should be able to: produce professional quality lettering with emphasis on proper slant, spacing, and use of guidelines. display various sets of blueprints and student work. compare good and poor lettering styles. read text material. layout guidelines. identify appropriate pencils and lead weights. print various size letters.	Students will: - read and display blueprints. - critique former student work. - understand the range of lead weights. - use slant drills. - use spacing drills. - use guideline drills. - use upper and lower case alphabets. - identify and use upper and lower case alphabets - identify and use architectural lettering style. - demonstrate pencil control. - understand numeral shapes. - use and compare lettering templates. - use and compare transfer letters. - use and compare computer letters. - collect VICA dues. - view CAD lettering. - take test on lettering.	Students will: - work "word attack" software programmed with math terms at computer, when available. - review all algorithms to add, subtract, multiply and divide. - work addition, subtraction, multiplication and division problems at board. - compare addition, subtraction, multiplication, division problems (with answers on reverse) to have other students solve then. - compose two word problems involving each operation, with answer, to have other students answer. (Word problems should involve drafting profession.) - work problem of four operations on computer using Jhm or related software. (See reference page in back) - locate a picture in one of the professional drafting magazines and write a sentence about it using a math term.	Upon completion of the unit, the students should be able to: define all drafting terms that have mathematical applications. define all math vocabulary words and use them in a sentence. add whole numbers accurately (4 digit addends and problems containing 4 addends). subtract a 3-digit subtrahend away from a 4-digit minuend, with zeros. multiply a 3-digit multiplicand by a 3-digit multiplier to teacher satisfaction. load software into a computer and switch on components.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
LETTERING Continued from previous page.	Continued from previous page.	Continued from previous page. - work prime number game at blackboard. - read Chapter 1, "Practical Mathematics" or related material in similar text. - successfully pass a test. - compose complex mathematical expressions and other students solve them at blackboard. - discuss with teacher definitions and properties of integers, rational numbers and real numbers. - place the $< > =$ sign between two intergers, and rational numbers at the blackboard. Note: Remediation will consist of extra activities related to the deficiency during other modules so as not to hinder students' progress.	Continued from previous page. sequence a series of operations. identify prime numbers under 50. utilize order of operations to simplify numerical expressions which involve arithmetic operations, powers and grouping symbols. define interger, rational number, and real number and know properties of the real numbers. use $\backsim$ and $\backsim$ to show the order of numbers.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
SCALES & MEASUREMENTS Time Allotment: Days 10-13 Upon completion of the unit the student should be able to: work with fraction and decimal scales. measure accurately and draw line lengths to 1/64 or .01 of an inch or to one millimeter. view different scales. identify increments on various scales. measure line lengths. draw line lengths. add, subtract, divide, and multiply various lengths and measurements.	Students will: - recognize and read various scales: ...fraction ...decimal ...metric ...architectural - complete measuring exercises. - practice scaling exercises. - practice drawing exercises. - comprehend idea of 100% accuracy. - illustrate cost of mistakes. - apply to CAD. - take test on scale and measurement.	Students will: - play "Word Attack" (or other vocabulary game) on computer using math terms associated with fractions. - work addition, subtraction of fraction problems at board, reducing answers to lowest terms. - work multiplication and division of fraction problems at board. - work all four operations of fractions on computer using "Jhm" or related software. - identify fractional parts of inch and centimeter on a ruler. - use two rulers to add or subtract fractions and mixed numbers. - measure lines of drafting drawings and add them together on paper to obtain total length.	Upon completion of the unit, the students should be able to: define math terms associated with fractions. generate four equivalent fractions from a given fraction. reduce fractions to teacher's satisfaction. convert improper to mixed numbers and mixed numbers to improper fractions. identify the lowest common denominators for four different fractions and convert all fractions to the common denominator. identify operations which use lowest common denominators. add fractions with unlike denominators.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
SCALES & MEASUREMENTS Continued from previous page.		Continued from previous page. - measure lines of drafting drawings and subtract the smaller from the larger. - take a simple geometric drawing (sides are fractional inches), compute new sides and draw new figure at an increase fractional ratio (e.g. a pentagon which has a side of 2 1/8 inches to be redrawn 2 1/2 times larger). - review related chapters in math text, pg. 12-28 "Practical Mathematics." - complete assigned homework over related material. - complete successfully a test covering the four operations of fractions. Remediation: -work the remedial portion of the Jhm software (or equivalent) at the computer -review "Addition of Fractions" "Subtraction of Fractions," "Multiplication of Fractions," "Division of Fractions" film strips.	add mixed fractions with unlike denominators. subtract fractions with unlike denominators. subtract mixed numbers with unlike denominators. multiply fractions and mixed numbers. give example of fraction or a division problem. give example of a fraction as a ratio.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
TECHNICAL SKETCHING Time Allotment: Days 14-16 Upon completion of the unit, the student should be able to: recognize sketching as a drafting and design tool. sketch two dimensional shapes and simple three dimensional objects. identify types of sketches. outline sketch. apply details. execute quality overlays. gain ability to proportion. use graph paper.	Students will: - be provided with materials and pencils. - draw basic line shapes. (straight, arcs). - complete line drills. - be aware of proportion. - draw familiar objects. - use the block in method. - utilize graph paper as an aid to proportion. - review examples of good sketches. - sketch simple shapes. - sketch familiar objects. - sketch drafting problems. - compare a student collection of sketches. - participate in the VICA meeting.	Students will: - learn the rules for addition and subtraction of signed numbers. - work addition and subtraction of signed whole numbers and fractions at blackboard. - solve addition and subtraction of signed numbers using computers and Jhm software or equivalent.	Upon completion of the unit, the students should be able to: add and subtract signed numbers. Note: Students will complete the objectives for Vocational Applied Algebra I.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
ALPHABET OF LINES Time Allotment: Days 17-18 Upon completion of the unit, the student should be able to: identify and draw eleven types of lines. understand the differences of line weight and shape of each different kind of line. illustrate line types. relate to fundamental building blocks. sketch alphabet of lines. draw alphabet of lines. draw object using alphabet of lines.	Students will: - understand and use overlays. - produce drawing examples. - review textbook information and examples. - complete the sketching exercise emphasizing weight and type. - review line identity quiz. - complete the drawing exercises. - review and critique fine points. - complete drawing exercise using all types of lines. - apply to CAD. - keep notebook current.	Students will: - complete the work activities of previous unit (days 10-13).	Upon completion of the unit, the students should be able to: continue with objectives of previous unit (days 10-13). Note: Students will complete the objectives for Vocational Applied Algebra I.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
GEOMETRIC CONSTRUCTION Time Allotment: Days 19-25 Upon completion of the unit, the students should be able to: demonstrate an understanding of applied geometry and discover basic truths about arcs and angles. (Construct a variety of shapes using the geometric rules). identify geometric terms. bisect line and arc. bisect angle. construct parallel and perpendicular lines. construct various geometric shapes.	Students will: - be aware of historical application of geometry. - practice using the compass - prepare list of vocabulary terms. - complete a quiz on terms. - view geometric shapes. - construct angles and lines. - bisect lines, arcs and angles. - draw transfer angles. - draw geometric shapes. - study types of triangles. - draw shapes requiring geometric constructions. - apply to CAD. - write a synopsis and draw constructions in student notebook. - participate in VICA meeting.	Students will: - Review vocabulary associated with scales and ratios. - review measurements with scales. - use mechanical engineer's scale to measure line segments. - use architects scale to measure line segments. - increase or decrease the size of a given geometric figure (triangle or polygon) by using the appropriate scale. - compute area of square or rectangular rooms by using architectural drawings and a given scale. (Note: Students must measure walls with appropriate scale.) - view weights and measures (1937 A.V.) - work problems of ratios at board.	Upon completion of the unit, the students should be able to: articulate a definition of ratio and proportion. identify the mechanical engineer's or architect's scale. transpose from one scale to the next. use proper arithmetic operations to determine how to increase or decrease size. explain the relationship between the scale and size. use an engineer's and architect's scale to measure accurately.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
GEOMETRIC CONSTRUCTION Continued from previous page.		Continued from previous page. - read Chapter 5, "Practical Mathematics" or related material in other text. - be given drawing with full dimension measurements, and by using different scales. Determine the scale of the drawing. - measure the classroom and draw it to three different scales. - pass a test covering content area. - discuss and learn rules for multiplying signed numbers. - compute products of two signed numbers at the blackboard.	Continued from previous page. find product of any two signed numbers.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
INTRODUCTION TO COMPUTER AIDED DESIGN Time Allotment: Days 26-28 Upon completion of the unit, the student should be able to: demonstrate preliminary understanding of the uses of a computer in graphic design. perform preliminary tasks involving the computer. study computer history. discuss computer capabilities. explain basic computer language. explain menu design. understand imput basic CAD data.	Students will: - become familiar with computer facilities. - use software. - be aware of security needs. - read and use the computer manual. - understand computer terminology. - define component hardware and software. - explain menu and sub-menu. - initialize a disk. - understand major menu commands and interactions. - write chapter synopsis.	Students will: - review vocabulary. - view and work vocabulary on "Word Attack" on the computer. - work addition, subtraction, multiplication, substraction of decimals at computer using Jhm software or compatible. - work problems using versatiles. - work problems at board to insure algorithms. - use centimeter scale or ruler to measure drawings. - add, subtract measurements in centimeters. - take drawing with decimal parts of an inch and convert to fractional parts. - play bingo (common fractions are announced and decimal equivalents are covered on card).	Upon completion of the unit, the students should be able to: articulate relationship between fractions and decimal equivalent. identify common decimal equivalents when given the fraction. convert fractions to decimals and decimals to fractions. identify place value to one, ten, thousandth. add and substract decimal numbers to teacher's satisfaction. multiply decimal numbers. divide: ..whole numbers where the divisor is larger than the dividend ..whole numbers into a decimal number.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
INTRODUCTION TO COMPUTER AIDED DESIGN Continued from previous page.		Continued from previous page. - measure lines using a civil engineer's scale. - measure metric drawings that are undimensioned and write in measurements; compute areas of circles, and other shapes on drawing. - Pass test covering unit (Pg. 29-42 - text on decimal number in related text) - work addition, subtraction and multiplication of signed decimal number at blackboard. - review axioms for addition, subtraction, multiplication and equality axioms to simplify expressions.	Continued from previous page. ..decimal number into whole number ..decimal number into a decimal number add, subtract, multiply and divide fractional numbers to decimal numbers. review addition, subtraction, multiplication of signed numbers. identify and use the addition, multiplication and equality axioms to simplify expressions.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
BASIC DIMENSIONING Time Allotment: Days 29-31 Upon completion of the unit, the student should be able to: demonstrate basic understanding of size description. (Record the measurements of length, width and height.) use standard dimensioning systems to size drawings. view well-dimensioned drawings. take measurements. label blank drawings. identify types of lines used in dimensioning.	Students will: - practice locating dimension. - demonstrate standard practices. - understand the importance of completeness and accuracy. - demonstrate familiarity with the following: ...principle dimensions ...secondary dimensions ...centerlines ...dimension lines. - develop and use overlays. - demonstrate knowledge of industry standards. - review industrial examples. - solve practical problems. - understand scales and measuring instruments. - apply to CAD. - participate in VICA meetings. - complete synopsis in the notebook.	Students will: - discuss rules and algorithms for dividing signed numbers. - work division problems with signed numbers at the blackboard. - compose three division problems with signed numbers for other students to work. - work division problems of signed numbers on computers using Jhm or equivalent software.	Upon completion of the unit, the students should be able to: find the quotient of any two signed numbers. Note: Students will complete the objectives for Vocational Applied Algebra I.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
ORTHOGRAPHIC PROJECTION Time Allotment: Days 32-45 Upon completion of the unit, the student should be able to: represent an object using the orthographic projection method. demonstrate an understanding of the principle views and the proper location of those views. define orthographic projection. illustrate orthographic projection. display "glass" box that unfolds. sketch simple rectangular shapes using orthographic projection. draw accurately orthographic projections.	Students will: - demonstrate the location of length, width and height. - project slant surfaces. - recognize textbook examples. - review and critique former student work. - sketch "orthographics" of common objects. - compile architectural elevations as projections. - draw basic shapes. - draw and label dimension complex shapes. - apply to CAD. - participate in VICA final membership drive - Goal 100%. - review for test in notebook. - review for quarter exam.	Students will: - review different types of tolerances and demonstrate their meanings. - work tolerance problems on the board. - use drawings that supply tolerance; students apply bilateral limits. - explain dual dimensional drawings that give tolerances in inches only or metric. - solve for an unknown tolerance which is part of cumulative tolerances where other tolerances are given. - determine from drawings which objects exceed or do not meet a predetermined tolerance. - predetermine tolerances. - review for quarter exam. - take quarter exam.	Upon completion of the unit, the students should be able to: define tolerances. specify upper and lower limits in measurement when given the measurement and amount of tolerance in decimals and degrees. specify amount of tolerance when given measurements and upper/lower limits. understand and apply mathematic operations in figuring tolerances. use chart to supply missing information in tolerances in dual dimensioning where given tolerance in inches or metric. pass quarter exam after review.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
PICTORIAL DRAWING INTRODUCTION Time Allotment: Days 46-59 Upon completion of the unit, the student should be able to: sketch and draw various shapes by the isometric technique. display an understanding of dimetric and trimetric projections. apply the pictorial drawings to CAD. read and observe text information. collect examples of isometric drawings. practice sketching simple shapes as isometric drawing. construct and use isometric scales. draw dimetric and trimetric projections. apply isometric techniques to computer graphics.	Students will: - understand isometric projection principles as related to: ...normal surface ...inclined surface ...oblique surface - understand uses and limitations of isometric drawings. - demonstrate uses of isometrics. - construct arcs and circles in isometric. - understand applications of dimensions on isometrics. - exhibit CAD examples of pictorial drawings. - participate in VICA meetings. - complete test in notebook.	Students will: - review vocabulary. - review units of fractional measurements (English). - review units of metric measurement. - review decimal place value to four places. - learn to use micrometers. - learn to use verneer caliper. - measure objects with micrometer. - measure objects with verneer caliper. - measure objects with metric micrometer and record measurements in dual dimensions using conversion chart. - compare an object with its shop drawing (undimensioned) and dual dimension the drawing using micrometer and conversion chart.	Upon completion of the unit, the students should be able to: read a micrometer. read a verneer caliper. recite names of parts of instruments when requested (use during discussion of instruments). use measuring devises with accuracy. determine by using measuring devises if a part is within specified tolerances. be able to add, subtract, multiply, divide measurements. be able to compare measurements from instruments to determine fit and fit tolerance between shaft and hole.

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APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
PICTORIAL DRAWING INTRODUCTION Continued from previous page.		Continued from previous page. - find differences in dimensions of two parts by using instruments to determine dimensions then subtracting the smaller from the larger. - measure numerous shafts of different diameters and: - place them in order according to size - determine which will give the best RC 1 fit from a dimensioned drawing of a hole. - measure a part with a micrometer and multiply each measurement by a predetermined number (to increase the size). - record the new measurements on a undimensioned drawing. - divide measurements taken by measuring two parts with a micrometer, to determine how much larger one part is than the other.	

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
PICTORIAL DRAWING INTRODUCTION Continued from previous page.		Continued from previous page. - measure two parts with micrometer, one at lowest limit of tolerance, the other at the upper limit. - determine actual preferred measurement and the tolerance. - measure many objects with micrometer to determine which exceed tolerance limits and should be rejected. - multiply an integer by itself to compute a predetermined power. - multiply a literal by itself to compute a predetermined power. - identify and collect like terms to simplify an expression at the board.	Continued from previous page simplify expressions with exponents. identify monomials, binomonals and polynomials. determine the degree of the polynomals. add and subtract monomials and polynomials.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
SECTION VIEWS Time Allotment: Days 60-78 Upon completion of the unit, the student should be able to: define what a section view is and why it is used to describe certain objects. construct a section view from a given cutting plane. illustrate section views. illustrate the cutting plane. give rationale for section view. describe types of sections. draw examples of sections.	Students will: - identify the following types of section views: ...revolved ...broken out ...rotated ...aligned ...removed ...full ...offset ...half ...phantom sections - sketch section types. - draw examples of each. - demonstrate cross hatching technique. - illustrate break lines. - comply with standard practices. - identify the location of views. - submit application with CAD. - participate in VICA meeting. - complete a synopsis in notebook.	Students will: - review all vocabulary associated with percentage - learn how to change the basic formula to three formulas algebraically. - use formula to work problems at board. - use computer to derive answers to percentage problems (Jhm software or equivalent). - play bingo to learn common fraction/percent conversion (e.g. cards have percentages and caller draws and calls fraction equivalents). - compute interest statements on loans. - check accuracy of deductions of taxes from pay using pay stubs from drafting firm. - compute from drawings area of several objects and determine percentage of one to another.	Upon completion of the unit, the students should be able to: use all math vocabulary in discussions about percents. know, understand, and use the percent formulas. derive percentage on part of a multistep problem and use it to compute the answer. give verbally the percentage equivalents to common fractions. understand relationship between fractions and percentage. understand relationship between decimal numbers and percentage. compute percentage based on 10, 100, 1000. add, subtract percents.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
		Continued from previous page.	Continued from previous page.
SECTION VIEWS Continued from previous page.		- determine percent of rejects of manufactured parts by using quality control sheets from a manufacturer. - determine savings interest, and interest on debts from drafting companies. - explain a drafting company's budget in percentages by line item or cost amount (e.g. 69% of expenses are salaries). - average the percentage of one cost center of a company budget over X years. - determine percentage of error of X number of parts by using a micrometer. - use catalogues of drafting equipment to determine cost of items selected at a predetermined discount of catalogue price. - figure number of man hours required to produce several drawings.	draw pictorial presentations of percents via graphs. analyze data and derive percents. explain percent of error. derive percent of error. understand and compute percentages greater than 100 and less than 1. average percents. determine profit and discount.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
SECTION VIEWS Continued from previous page.		Continued from previous page. - calculate the cost of man hours. - determine how much to charge another company for the drawings to make a pre-determined profit. - fill out a 1040 tax return. - fill out a corporate tax return for a drafting company. - figure percentage of savings in man hours and personnel costs of a CAD terminal compared with traditional drafting. - pass a content test. Note: Refer to 1952-62 in Practical Mathematics or equivalent material in another text.	

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
SECTION VIEWS Continued from previous page.		Continued from previous page. - multiply literals, which powers are assigned randomly by drawing a one-digit number from 0 to 9. - substitute numbers for literals with exponents and demonstrate equality by applying orders of operation. - work multiplication of polynominals by monomials at board. - divide polynomials by monomials.	Continued from previous page. find the product of two identical literals with different exponents $(A^x + A^y = A^{x+y})$ find the product of a monomial and a polynomial. find the factors of a simple polynomial. find the quotiant of a polynomial divided by a monomial.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
AUXILIARY VIEWS Time Allotment: Days 79-90 Upon completion of the unit, the student should be able to: understand what an auxiliary view is and when an auxiliary is required. project an auxiliary view using the reference plane line technique. illustrate auxiliary views. sketch auxiliary views. read text information. view professional examples. apply to CAD.	Students will: - understand primary auxiliary view. - set up and demonstrate line of sight. - recognize a reference plane. - illustrate the location and use of reference plane. - demonstrate the transfer of measurement. - practice labeling of points. - draw and label dimensioning section views. - project complex shapes. - project and draw complete auxiliary views. - sketch partial auxiliary views. - apply to CAD. - complete synopsis in student notebook. - participate in VICA meeting. - review quarter exam.	Students will: - view vocabulary terms. - construct line segments of various lengths. - construct angles of predetermined degrees. - measure angles from machine drawings. - solve for all angles where given one angle of intersecting lines and intersecting parallel lines. - bisect angles. - review machine drawings and classify angles to types. - review pgs. 276-278, "Engineering Drawing and Graphic Technology" study. - draw orthographic projection of simple objects with lines or angles and identify each plane of the object.	Upon completion of the unit, the students should be able to: use vocabulary associated with geometry. identify types of line segments. use compass, rules and protractor. measure angles within ½ degree. construct angles to predetermine degree. recognize types of angles. construct a circle of any given radius. describe the relationship between diameter and circumference.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
AUXILIARY VIEWS Continued from previous page.		Continued from previous page. - study an orthographic and isometric drawing of a solid geometric figure and: - contrast the difference - select which drawing accurately reflects a plane in geometry and explain why - draw auxiliary views of a pyramid. - pass a test covering the content material. - review for quarter exam. - review for semester exam. - take quarter exam. - take semester exam.	Continued from previous page. understand relationship of angles of intersecting lines and sets of intersecting parallel lines. articulate the concept of a plane. pass quarter and semester exam.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
DIMENSIONING Time Allotment: Days 91-105 Upon completion of the unit, the student should be able to: dimension accurately simple and complex geometric shapes. understand a variety of dimensioning systems. interpret complex industrial prints produced by professionals from various technical fields. draw and locate dimension lines and symbols. locate major dimensions. discuss differences between shape and size. practice dimensioning pre-drawn shapes. dimension student drawings. apply metric dimensions. apply to CAD.	Students will: - review historical measurements. - understand interchangeability of parts. - recognize fundamental machine tool practices. - demonstrate ability to do dimensional drawing including: ...size description ...location of dimensions ...conventions and standards ...dimension and extension lines ...arrowheads and leader lines ...center lines ...scale of drawing ...notes of drawings ...surface finish - complete test in student notebook. - participate in VICA activity.	Students will: - review vocabulary. - construct circles with compass at assigned radii. - measure circumferences of various sizes of jar lids with string, and diameters with ruler. - divide to fine relationship (Pi) - mark off large circles (radius of three or more meters) outside. - locate center of circle by constructing a perpendicular line to a line tangent to circumference. - make a chart as to angular measurement and find what fraction/percent of the circle is covered by that angle (e.g. 90° < = ¼ or 25% of the circle). - construct circles of different radii.	Upon completion of the unit, the students should be able to: know vocabulary associated with unit. know and apply formulas to find common measurements of a circle. understand angular measurement and the 360° rotation of the radius around the center or axis. understand function of Pi (π). locate the center of a circle. construct a circle. use compass and protractor.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
DIMENSIONING Continued from previous page.		Continued from previous page. - measure and record radius and diameter. - compute and record measurement of circumference, and square area. - compute area of circles on drafting drawings. - circumscribe a small circle inside a larger one. - compute area of larger circle not covered by the smaller. - review vocabulary. - construct types of triangles. - identify types of triangles found in drafting drawings. - construct an equilateral inside of a circle having the three points located on the circumference of a circle. - construct triangle when given the measurements of one side and two angles.	Continued from previous page. use vocabulary associated with the unit. recognize types of triangles. construct types of triangles to predetermined dimensions. compute or solve for angular measurement of third angle when two are given. recognize similar triangles by applying angle-angle similarity or theorems. use the pythagorean theorem to solve for hypotenuse when other two sides are given. use theorems to recognize congruent triangles.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
DIMENSIONING Continued from previous page.		Continued from previous page. - construct a triangle and bisect the three angles. - extend the bisector to opposite side. - determine how many triangles are formed and what type. - measure dual dimension pre-drawn triangles and use measurements, formulas to compute perimeter, altitude, and area. - view drawings and indicate shapes which are circular and triangular. - pass a test covering content area.	

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
TOLERANCING Time Allotment: Days 106-110 Upon completion of the unit, the student should be able to: understand industrial practices with tolerancing and precision dimensioning. create a tolerance table and place tolerance limits on his dimensioned drawing. explain need for tolerance dimensioning. equate industrial standards to the ability to produce within tolerance limits.	Students will: - review samples of parts produced with good and poor tolerancing. - understand normal size. - understand basic dimension. - demonstrate ability to understand and use these limits: ...interference allowance ...clearance allowance ...notation rules for tolerance ...decimal and fractional tolerance system ...ASA fit classifications ...draw and tolerance given mating parts ...complete a tolerance table - complete test in student notebook. - participate in VICA meeting.	Students will: - review vocabulary. - learn meanings of prefixes to name (e.g. penta) and determine other words that share same prefix (e.g. octagon - octapus). - construct each polygon. - construct each in a circle so all points intersect with the circumference. - construct assigned polygon five times. Note: Student then will dual dimension each figure. Other student will measure each construction to ascertain whether each is within predescribed tolerances Students will reject those outside of tolerance limits. (e.g. angles ± 1°). - construct polygons with sides longer than three meters outside activity. - pass a test covering the content area.	Upon completion of the unit, the students should be able to: understand and use vocabulary associated with polygons. construct polygons. recite interior angular measurement with equal lateral polygons. use formula to compute interangular measurement with regular polygons.

APPLIED MATHMETICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
INTRODUCTION TO THREADS, FASTENERS AND SPRINGS Time Allotment: Days 111-115 Upon completion of the unit, the student should be able to: demonstrate the way new parts are joined together or "fastened." identify standard screw threads and standard fasteners. draw various bolts, bolt head, screws and thread types. learn terminology. view fasteners. draw schematics. learn standard symbols. sketch thread representations. draw views of threads, fasteners, and springs.	Students will: - sketch samples. - draw symbols. - draw various bolts, screws and fasteners. - apply knowledge to tolerancing. - exhibit CAD drawings of threads and fasteners. - complete synopsis in student notebook. - illustrate uses and types of fasteners: ...keys ...nails ...wood screws ...tapping screws ...rivets ...pins ...washers - recognize and identify examples of bolts, screws, nuts springs and machine parts.	Students will: - review vocabulary. - use formulas to compute volume. - compute volume of several cylinders and use graduated cylinders and water to check accuracy. - compute volume of a plastic cube and use graduate powder and water to check for accuracy. - draw pattern for cube on one plane. - cut it out and assemble it into three dimensional shape. - draw cylinder pattern on one sheet. - cut it out and assemble it. - compare cylinder shape to various fasteners. - draw cylinder pattern. - measure the rectangle and two circles and add up square area.	Upon completion of the unit, the students should be able to: use vocabulary associated with unit. visualize solid forms of cylinder and cube. compute volume of cylinder and cube. compute surface area of cylinder and cube. draw a cube and cylinder in one plane (pattern).

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
INTRODUCTION TO THREADS, FASTENERS AND SPRINGS Continued from previous page.		Continued from previous page. - cut it out and use the formulas to determine surface area of cylinder. - repeat exercise with cube. - pass a test covering content area.	

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
MANUFACTURING AND SHOP PROCESSES Time Allotment: Days 116-120 Upon completion of the unit, the student should be able to: know various manufacturing processes. identify and know the properties of various metals. demonstrate an understanding of machining techniques. learn manufacturing notation. tour school's metal shop. examine a variety of manufactured or machined parts. discuss machining and automation. define technical terms.	Students will: - recognize machined parts examples. - recognize manufactured parts examples. - tour machine shop. - understand basic shop process of: ...casting ...machining ...fabrication ...pressure forming ...measuring devices ...knurling ...surface finishing ...notation technique - perform basic operations using model room equipment (if available). - discuss metallurgy and properties of ferrows, metals and plastics. - complete test on information. - participate in VICA meeting.	Students will: - write list of questions to ask shop workers about how figures on drafting are used in machine setup and quality control. - take field trip to machine shop to ask questions; write down answers. - interview office manager at shop to determine how to figure net profit. - review with manager purchase orders for supplies and materials. - determine square feet of useable floor space from plant layout. - plan for most efficient use. - write an essay illustrating all functions of a computer as used in a drafting business. (e.g. payroll, profit loss statement, CAD, billing.)	Upon completion of the unit, the students should be able to: identify uses of math in the manufacturing and shop processes. relate how dimensions of shop drawings are used in manufacturing final product. understand relationship between waste control ratio of rejections (out of tolerance) to marketable prices compute net profit when given gross profits and all deductions (wages, materials, overhead)

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
MANUFACTURING AND SHOP PROCESSES Continued from previous page.		Continued from previous page. - become familiar with typical math functions such as billing, P.O.'s, bank deposits. - review a business' 5-year plan and what mathematics were involved in formulating. - read several house journals from larger machine tool or manufacturing firms and circle statements that are conclusions from a math data base. - Tell what type of math was used to draw conclusions (e.g. profits up 5%). - complete a notebook* involving different forms that a drafting business uses with steps on how to complete or read the forms. - pass a test covering content area. *May be performed over rest of year.	

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
MANUFACTURING AND SHOP PROCESSES		Continued from previous page. - identify the rational algebraic expressions from a paper that contains many types of algebraic expressions. - simplify rational expressions at the blackboard. - identify those formulas from geometry that are rational algebraic expressions - identify those geometric formulas that have rational coefficients. - select three rational algebraic expressions on 3x5 cards from a stack of cards and then express them with a common denominator at the blackboard.	Continued from previous page. identify the rational algebraic expression and simplify it. express rational algebraic expressions with common denominators. find the sum, difference, product and quotient of two rational algebraic expressions.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
WORKING DRAWINGS Time Allotment: Days 121-135 Upon completion of the unit, the student should be able to: describe the states in the design process of a new part. prepare detailed drawings from pictorials, engineers' sketches and written specifications. check drawings for errors. view professional working drawings. elaborate on details needed for shape description. elaborate on details needed for size description. explain parts list and specifications. draw working drawings from given information.	Students will: - discuss types of detail drawings - observe professional examples of working drawings. - examine a representation of standard parts. - identify and examine: ...notation ...sized description ...numbering systems ...checking and alterations ...industrial practices ...ANSI standards - draw detail drawings from pictorials, engineering data, design and assmebly layout. - print and check drawing. - redraw necessary corrections. - participate as student checkers. - exhibit CAD examples of working drawings. - complete synopsis in notebook.	Students will: - review and learn vocabulary. - examine solid geometric shapes - compute volume of solid geometric shapes. - measure angles and sides of solid geometric shapes. - draw patterns in one plane to construct geometric shapes. - compute area of one side. - compute surface area. - measure a geometric solid and draw orthographic projections which are dual dimensioned. - design a predetermined geometric solid to hold a predetermined volume. - draw pattern in one plane and one in orthographic projection - cut out pattern in one plane.	Upon completion of the unit, the students should be able to: know and use vocabulary for solid geometry. identify types of solid shapes. view solid geometric forms and draw pattern in plane geometry. draw orthographic projection from a solid form. compute volume. know relationships of angles. pass the quarter exam.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
WORKING DRAWINGS Continued from previous page.	Continued from previous page. - participate in VICA activity. - review for quarter exam.	Continued from previous page. - fold and assemble - use sand to check accuracy of volume. - solve for missing angles or sides on a drafting drawing that has partial information. - solve problems on computer. - pass a test covering the content area. - review for quarter test. - take quarter exam. - discuss properties of proportions and their application to geometric shapes. - construct a new triangle to a predetermined size from an existing triangle when given just the ratio. - determine the ratio between two similar triangles. - determine ratios between gears using gear ratio formulas.	Continued from previous page. use ratios and proportions to solve problems. use equations with fractional, decimal, or whole number coefficients to solve problems.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
WORKING DRAWINGS Continued from previous page.	Continued from previous page.	Continued from previous page. - solve for unknown angles or sides of geometric shapes by using ratios. - create formula to find missing side of two similar triangles using corresponding sides. - solve equations at board. - review algorithms to solve linear equations with two variables by substitution. - work linear equations at board. - students compose linear equations to solve for perimeters of rectangles. - students solve linear equations generated by the computer. - write definitions of slope and y-intercept and explain them to the class using a graph.	Continued from previous page. solve linear equations with two variables. find the slope and y-intercept of a line of a given equation.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
WORKING DRAWINGS Continued from previous page.	Continued from previous page.	Continued from previous page. - determine the slope of a line using coordinates presented by the teacher. - determine slope of a line on a graph that has no coordinator marked. Also determine y-intercept. - graph a line using two pairs of coordinates, and then compute slope and y-intercept.	Continued from previous page. graph linear equations. solve and graph inequalities in one variable. graph inequalities in two variables.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
INTRODUCTION TO ASSEMBLY DRAWINGS Time Allotment: Days 136-150 Upon completion of the unit, the student should be able to: understand the different kinds of assembly drawings. use standard part numbering systems. write a standard bill of material. explain functions of assembly drawings. describe the use of dimensions on assembly drawing. define the types and use of various assembly drawings. lay out drawing on large sheet of paper. number parts and make parts list. write a bill of material.	Students will: - view samples of assembly drawings. - examine parts that can be assembles. - study textbook examples. - work with numbering systems. - produce a bill of materials. - recognize leader lines. - recognize balloons on assembly. - draw a simple assembly drawing. - construct bill of material. ...item number ...part name ...material ...part number ...quantity required - draw complex assembly drawing. - reproduce drawing for student's portfolio. - synopsis in student notebook. - participate in a VICA meeting.	Students will: - review vocabulary. - construct ellipses. - compute area and circumference problems at board. - use formulas to solve for unknowns. - demonstrate the use of the ellipse in pictorial drawings. - view pictures and identify ellipses in construction. - view drafting drawings and identify ellipes. - compute area and circumference - work problems from textbook. - draw an orthographic view of a part that has an elliptical hole in it. Student must measure part and provide dimensions.	Upon completion of the unit, the students should be able to: know and use vocabulary associated with ellipse. know major and minor axis. compute circumference and area. explain differences and similarities between circle and ellipse. identify uses of ellipse in drafting.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
INTRODUCTION TO ASSEMBLY DRAWINGS Continued from previous page		Continued from previous page. - pass a test covering content material. - fill out a statement or billing charging for labor on a drawing. - add costs on a parts list. - compute costs of one part and then compute material cost of production - determine number of parts rejected, cost of parts and labor. Then total the loss that the rejections cost the company.	Continued. add up correctly a bill of labor. add up a bill of materials. determine material costs if given cost for each part. compute material costs of components to determine cost of part. determine material cost on a production run by allowing for a pre-determined percent of rejects. take over all productive costs and number of items made to determine cost per item. become familiar with software programs that inventory materials and bill materials.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
INTRODUCTION TO ARCHITECTURAL DRAWING Time Allotment: Days 151-170 Upon completion of the unit, the student should be able to: draw residential floor plans and elevations. use standard architectural scales. identify the primary terms to describe standard construction. display sets of architectural plans. explain use of scales. read textual information. draw floor plan layouts. draw elevations. identify architectural material symbols.	Students will: - review sets of architectural drawings. - study architectural scale models. - practice architects' scales. - explore architectural career opportunities. - study new building materials. - demonstrate knowledge of standard construction practices. - explore trends in housing (solar, etc.) - layout floor plan. - practice architectural dimemsioning and lettering. - layout elevations. - identify material symbols and notations. - figure square and cubic footage. - complete architecture details and additional drawings for advanced students.	Students will: - review vocabulary associated with the unit. - review architectual plans and identify geometric shapes. - explain if their purpose is structural or decorative (Note: Some geometric shapes are used for strength too - triangle.) - determine number of sections of each type and length of board or sheet of plywood needed from drawing. - determine cost from lumberyard price list. - calculate number from drawings of bricks to be used, and number of bricks necessary. - determine cost. - learn how to use drawings to determine pitch.	Upon completion of the unit, the students should be able to: know vocabulary associated with the unit. identify geometric shapes. know and use formula for area, circumference and perimeter. calculate number of bricks needed to build a brick wall. calculate the different sizes of boards needed from the framing drawings. determine cost of wood components. compute square area from drawings. compute minimum BTU's necessary to heat/ air condition home from drawings.

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
	Continued from previous page.	Continued from previous page.	Continued.
INTRODUCTION TO ARCHITECTURAL DRAWING Continued from previous page.	- apply to CAD.	- learn how to use framing square to cut boards to desired angle. - photograph geometric shapes on nearby buildings. - learn formulas for square area. - calculate square feet of each floor. - calculate amount of carpet needed to carpet home or building. Note: Student selects carpet and then from price list, determines cost of carpet. - determine amount of BTU's needed to heat/air condition house. - learn about building units used in production builders. - calculate square area of walls to be painted. - determine how many gallons they will need to order and the total cost of paint.	calculate from material lists and cost of labor the constructor's actual cost of a building or house.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
INTRODUCTION TO ARCHITECTURAL DRAWING Continued from previous page.		Continued from previous page. - calculate square area of roof and determine how many roofing shingles will be needed. - determine costs - review words or vocabulary - review decimal numbers - review percentage formulas - work problems at board - work at computer with Jhm or related software - determine from architectual plans (rough estimate) cost of materials, labor needed. - determine interest on the loan over x years. - determine selling price of house to make x% profit. - determine selling price of house to make x number of dollars profit.	know vocabulary associated with unit. calculate amount of interest on a loan. calculate compound interest. calculate net profit. calculate appreciation. calculate depreciation.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
INTRODUCTION TO ARCHITECTURAL DRAWING Continued from previous page.		Continued from previous page. - calculate how much the dollar value of a building or home has increased by using percentage of appreciation in the Sunday newspaper. - calculate the percentage of appreciation when given the old and new appraisal of properties. - calculate percentage of cars when given old and new dollar costs (sticker and Blue Book). - calculate Blue Book value in a car when given the sticker price and percent of depreciation. - discuss how companies can depreciate computer and other drafting equipment. - pass a test covering unit.	

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
INTRODUCTION TO ARCHITECTURAL DRAWING Continued from previous page.		Continued from previous page. - practice finding square roots of numbers by division and other methods. - find square roots by using a calculator. - find square roots using a chart. - identify rational and irrational numbers from numerous radicals presented by teachers. - add, subtract like and unlike radicals at blackboard. - multiply polynomials containing radicals at board. - divide radicals at board. - solve equations with rational expressions at board. - use equations to find the circumference of an ellipse.	Continued from previous page. simplify rational square roots. simplify radical expressions. define irrational number and find the decimal approximation. find the product and quotients of radical expressions. find the sum and difference of radical expressions. solve equations involving rational expressions.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
REPRODUCTION AND CONTROL OF DRAWINGS Time Allotment: Days 171-172 Upon completion of the unit, the student should be able to: explain several methods of reproducing original drafting documents. operate the available "blueprint" machine. produce drawings of sufficient line quality and weight to be reproducible. explain reproduction methods. demonstrate storage of drawings. run drawings through printing machines. explain numbering and filing systems. explain filing in CAD system.	Students will: - practice and understand reproduction techniques: ...blueprint process ...blueline prints ...microfilm - study samples of reproduced drawing. - practice drawing techniques to produce good reproduction. - understand the need for cleanliness and proper line weights. - run prints. - make adjustments and settings on machine. - review and practice maintenance of reproduction machine. - complete synopsis in student notebook.	Students will: - learn units of time measurement from seconds to centuries. - work conversions at board. - break down days worked into months, weeks, days using a calendar, starting and ending dates. - learn concepts of "work week," "tour of duty" and "work hours" - compute hours worked by reading a time card. - compute weekly wage when given hourly rate. - compute yearly salary when given a: ...monthly check stub ...bi-weekly check stub ...weekly check stub - fill out time card in tracking homework or other assignments. Note: This unit is pre-requisite for module U.	Upon completion of the unit, the students should be able to: understand time measurements--seconds to years. convert one unit of time measurement into another. add and subtract units of time. multiply units of time by any number. divide units of time by a number. explain similarities and differences between place value and time measurement units (denominate numbers).

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
REPRODUCTION AND CONTROL OF DRAWINGS Continued from previous page.	Continued from previous page.	Continued from previous page. - select quadratic equations from numerous equations on a page presented by the teacher. - review the algorithms for transformation of equation into standard form. - practice transformations at board.	Continued from previous page. define a quadratic equation. transform equation into standard form.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
TECHNICAL OFFICE PRACTICES Time Allotment: Days 173-175 Upon completion of the unit, the student should be able to: write various technical or professional communications. practice writing memos, cover letters and reports. gather information from telephone conversations and personal contacts. write memos. write technical report. write letter of transmittal with reference to technical document. take "field" measurements and information for later use in "office." visit technical office.	Students will: - review examples of professionally typed documents: ...memos ...transmittal letters ...technical reports ...estimates ...progress reports ...expense accounts - communicate with speaker from industry. - write using blank forms. - discuss problems with communications. - write technical documents. - practice using professional references: ...sweets catalogues ...manual of steel construction - visit engineering office. - present student projects. - complete synopsis to go in student notebook.	Students will: - learn vocabulary associated with unit. - work problems at board. - figure deductions from actual payroll statements. - compute weekly/monthly wage when given time card with regular tour of duty, overtime, night and Sunday differential. - fill out a time card. - compute cost of labor for a drawing when given hourly rate and number of days/hours needed for completion. - complete fake payroll documents including W-4 from a drafting firm. - pass a test covering content material from last two modules.	Upon completion of the unit, the students should be able to: know and use terminology associated with the unit. figure accuracy of payroll deductions. figure gross salary based on hourly wage or weekly salary. compute adjustments in salary or wage rates such as overtime, night differential, Sunday differential, time and a half, double time. understand W-4 forms.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
TECHNICAL OFFICE PRACTICES Continued from previous page.	Continued from previous page.	Continued from previous page. - solve quadratics at board. - solve quadratics using computer.	Continued from previous page. solve quadratic equations by factoring.

APPLIED MATHEMATICS: DRAFTING I

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
PROFESSIONAL PRACTICES Time Allotment: Days 176-180 Upon completion of the unit, the student should be able to: know various rules or hints to a high quality interview. go through a mock interview. write resume. fill out applications. practice interview skills. discuss proper dress and grooming. discuss job market. explain available student employment agencies.	Students will: - review examples of professional resumes. - review examples of student resumes. - practice filling in blank job applications. - study job descriptions and classified ads. - view and discuss visual aids on about interviewing techniques. - write or type resume. - fill out job application and grade on completeness, neatness and accuracy. - interview students in front of class. - participate in interviews conducted by professionals. - report on part-time or summer employment. - review for quarter exam.	Students will: - review math skills over year by working problems at board. - work review problems at computer. - review math questions generally asked on employment tests. - take an employment test. - review for final exam. - pass exam successfully. - work quadratic equations at board using quadratic formula. - use the quadratic equation to solve related problems in drafting.	Upon completion of the unit, the students should be able to: become aware of math skills employers expect employees to have. pass a pre-employment test on math skills. pass semester exam. solve quadratic equations using the quadratic formula.

REFERENCES

Drafting Text

Engineering Drawing and Graphic Technology

French, Uierck, Foster, 1986

Current Mater Text

Practical Mathematics

Palmer, Mrachek, 1986

Jhm Math Software of Minnesota, Inc.

P. O. Box 41308
Minneapolis, MN 55441

APPLIED ACADEMICS

MATHEMATICS

THE APPLIED MATHEMATICS OBJECTIVES AND ACTIVITIES FOR EACH VOCATIONAL CONTENT AREA ARE TO BE INTEGRATED INTO THE GRADED COURSE OF STUDY AND THE CURRICULUM BULLETINS ADOPTED BY THE CINCINNATI PUBLIC SCHOOLS.

The following Geometry essential skills are to be taught throughout the Drafting I curriculum. Although the math is applied to the vocational content, the math teacher will also be teaching the following skills.

GEOMETRY

ESSENTIAL SKILLS

1. Identify common quadrilaterals.
2. Define terms which describe relationships between lines.
3. Classify triangles according to sides/angles.
4. Define terms related to circles and polygons.
5. Identify common three-dimensional figures.
6. Identify the relationships between two angles.
7. Identify the symbols used to represent common geometric figures and terms.
8. Given specific geometric information, use the deductive process to draw conclusions.
9. Apply theorems about parallel lines cut by a transversal.
10. Estimate the degree measure of an angle.
11. Identify theorems or postulates that are used to prove two triangles congruent.
12. Identify the number of dimensions pictured in a geometric representation.
13. Use proportions to solve problems involving similar triangles.
14. Identify and apply the Pythagorean Theorem.
15. Use 30-60-90 and 45-45-90 theorems to solve problems.
16. Identify the proper steps for the seven basic constructions.
17. Calculate the area and circumference of a circle.
18. Visualize figures in various positions on the plane and in 3-space.

APPLIED ACADEMICS

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12TH GRADE CURRICULUM

The following instructional activities are divided by grade level and are intended to assist you in teaching the objectives in the graded course of study. As supplements to the activities, instructional information is given in the introduction, philosophy and goals sections at the beginning.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
ORIENTATION Time Allotment: Days 1-4 Upon completion of the unit, the student should be able to: demonstrate an understanding of the rules of laboratory operation and of safety and behavioral expectations. understand a use of all lab equipment, tools, and materials. prepare a notebook divided into sections appropriate to the needs of varying course content. review student handbook and school rules. study fire/tornado procedures. prepare notebook and copy senior year outline. demonstrate knowledge of handling equipment and tools.	Students will: - review student handbook. - discuss drug and alcohol abuse. - organize a notebook. - review parts and operation of a drafting machine. - operate the blueprint machine. - clean a drafting table, machine and instruments. - discuss progress chart. - discuss the VICA organization. - review grading and testing policies. - write the names of all equipment and instruments in notebook. - discuss daily inventory of assigned tools. - test for lab procedure and equipment knowledge. - write assignment from handbook.	Students will: - review course outline and grading policy. - be informed about the expectations of the course. - receive books and materials necessary for course. - complete a review of the four basic operations with whole numbers and fractions. - work problems at board. - work problems on computer with Jhm software or equivalent. - take needs assessment test. - work activities which follow the geometry course of study.	Upon completion of the unit, the students should be able to: complete assessment test of their skills and knowledge. articulate expectations of course and its requirements. be familiar with four basic operations of whole numbers and fractions. complete the objectives of the geometry course of study throughout this senior year.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
ORIENTATION - Continued complete book cards and record cards for assigned tools. demonstrate an understanding of VICA as a student organization. review grading policy, testing procedures, work expectations.	Continued from previous page. - participate in an introduction to VICA.	Continued from previous page. - discuss contributions of Euclid in geometry. - draw a timeline with dates and significant developments in geometry. - write a paragraph describing geometry's use in drafting.	Continued from previous page. understand contributions of Euclid to the study of geometry and its development and use as applied to drafting.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
ORTHOGRAPHICS/WORKING DRAWINGS Time Allotment: Days 5-14 Upon completion of the unit, the student should be able to: understand thoroughly the principles of view choice and placement; project techniques; dimensioning practices and the ability to complete a working detail drawing. select proper views of assigned solids. use appropriate planning layout and draw details. demonstrate proper projection techniques on details. locate properly required detail dimensions. complete title block with appropriate information	Students will: - prepare a sketch before beginning detail work. - center detail on medium spacing of views for dimension planning. - select an appropriate scale. - block in views for a planning layout. - use templates and drafting equipment. - check equipment before work. - select proper size medium. - check details for completion. - test for mastery of drawing procedures. - write chapter synopsis. - participate in VICA meeting.	Students will: - make place value charts for decimal numbers. - work operations at board. - add, subtract, multiply divide decimal numbers. - review calculator operations. - work problems with decimal unknowns using calculators. - average numbers with and without calculators. - review vocabulary associated with unit. - review and know algorithms. - practice problems at board. - use calculators to solve problems. - explain why 3^2 is not 6. - review first 5-place value (binary-decimal system of numeratives) in Bases 2 through 10.	Upon completion of the unit, the students should be able to: learn vocabulary. read a decimal number and identify place value to the hundred-thousandth place. add, subtract, multiply and divide decimal numbers. use a calculator to work the four functions. average numbers. know and use vocabulary associated with unit. raise any base to any power (from 0-4) without a calculator. raise any base to any power with calculator.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
		Continued from previous page.	Continued.
ORTHOGRAPHICS/WORKING DRAWINGS - Continued		- make a place value chart.	use any table of square, or cube roots.
		- make a chart with base numbers 1-10 vertically on the left side; the exponents 1-10 across the top and values in rows.	compute square or any power of a base number in basic by using a computer.
		- study Chapter 7 and work assigned problems.	know, describe and use the undefined terms: point, line and plane,
		- pass a test covering content material.	line segment, degrees and ray.
		- construct lines, line segments, rays and points of predetermined lengths, and label them.	identify types of lines.
			know parts of an angle.
		- construct angles of predetermined degrees.	name or identify lines, line segments, rays and angle.
		- measure angles on draftings.	measure an angle.
		- construct two or more adjacent angles of predetermined degrees, then measure the large angle of all of them combined.	combine angles by addition.
		- demonstrate a line within a plane and a line passing through a plane using string and a flat piece of cardboard.	

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
COMPUTER AIDED DESIGN Time Allotment: Days 15-24 Upon completion of the unit, the students should be able to: understand thoroughly the capabilities of computers in drafting and design and of hardware/software components. discover the capabilities of a software system which will be ongoing through the four instructional groupings. apply, after mastery, the information of each new module to the computer. define the function of computers in drafting. study the history of computer development. describe the components of a CAD system. define main and sub menus.	Students will: - use and understand computer terminology. - use and understand computer languages. - define component hardware and software. - explain menu amd sub-menu. - read hardware operations manuals. - initialize a disk. - understand major menu commands and interactions. - digitize a drawing. - use levels. - change drawing scale. - change line style. - use area calculations menu. - input keyboard coordinate information. - save a drawing. - retrieve a drawing from file. - modify an existing drawing file. - make a library.	Students will: - review vocabulary. - review steps in measuring with micrometer and venier caliper. - practice taking measurements of actual objects. - review tolerance. - review steps in reading the metric inches measurement conversion chart. - dual dimension a simple drawing which is dimensioned in either metric or inches. - measure a dozen production parts (all same part) against dimensions on the drawing and mark those which are out of tolerance. - review Chapter 6 in math text. - review concepts. - work problems at board. - review computer terms from drafting.	Upon completion of the unit, the students should be able to: know vocabulary associated with the unit. know parts of micrometer, venier caliper. measure items accurately using both instruments. know limits of accuracy. read the conversion chart between inches and metric. dual dimension a drawing. read a tolerance and determine by micrometer or venier caliper those objects that are in or out of tolerance.

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OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
COMPUTER AIDED DESIGN Continued digitize drawing information. input keyboard coordinate date. plot work-file drawing. store completed projects on disks. discuss typical industrial applications of CAD.	Continued from previous page. - use levels. - use and understand switches. - pilot a drawing. - input plotter specifications. - use grids. - name a group. - merge a drawing with another. - test for definitions and menu functions. - write chapter synopsis. - VICA meeting.	Continued from previous page. - work at computer to solve proportion and ratio problem. - measure drawing of five triangles and discover the two which are similar. - use similar right triangles to measure the height of the school building. - review Chapter 5. - locate specific gravity of water. - write down two items that have a lower specific gravity than one and two items that have heavier specific gravity. - bring items to school and predict which will float. Note: Math teacher will place items in water. - pass a test covering the content area or the unit.	Continued from previous page. know and use vocabulary associated with unit. articulate concept of ratio and proportion. describe use of ratio and proportion in drafting. solve for an unknown in proportion. identify similar triangles by formula and measurement. use similar triangles to measure distances. identify similar polygons by formula and measurement. define density and use a table to locate specific gravities.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
COMPUTER AIDED DESIGN Continued		Continued from previous page. - discuss the logical sequences used in a proof and explain in their own words why proofs are necessary to the study of mathematics. - review proofs of complementary and supplementary angles adding up to 90° and 180° respectively. - prove that vertical angles of intersecting lines are equal. - explain applications of proofs to draftings. - prove that complements and supplements of equal angles are equal in intersecting parallel lines.	Continued. define proof, complementary and supplementary angles. discuss algebraic properties that may be used in geometric proofs. identify four types of proofs.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
SHEET METAL/DEVELOPMENTS Time Allotment: Days 25-34 Upon completion of the unit, the students should be able to: demonstrate an understanding of sheet metal applications in industry and the methods used to represent formed shapes as flat developments. list sheet metal applications. define development drawing. define functions of sheet metal drafter. calculate sheet sizes and bend locations. identify stock gauges. specify sheet metal joints, seams, hems, and fastening methods.	Students will: - define development. - list applications in industry - understand the sheet metal fabrication processes. - study types of gauges. - review geometric shapes, surfaces and solids. - define four basic geometric solids. - perform calculation of bend lines. - plot curved surfaces. - lay out standard drawing presentation and dimension requirements. - dimension the development. - test for definitions and mastery of calculation methods.	Students will: - know vocabulary terms and meanings. - identify components of terms and algebraic expressions from a book. - apply correct sequence in multi-operational expressions in problems at board. - gather facts about the class and write them into sentences. - express their algebraic formulas (i.e. number of students who brought their lunch, added to students who buy their lunch and students who skip lunch is equal to number of students in class $x + y + z = 31$). - select two formulas from geometry. - explain the meanings of literal variables. - select several conversions from the back of the book and write them in an algebraic expression.	Upon completion of the unit, the students should be able to: know and use vocabulary associated with unit. identify the coefficient, variable, exponent and terms of an algebraic expression. substitute a given value or number for a variable and compute the answer. know the order of operations. know grouping signs and their uses. translate a literal sentence into algebraic equations.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
SHEET METAL/DEVELOPMENTS Continued identify four basic geometric shapes. lay out assigned shapes and developments and dimension. construct cardboard model.	Continued from previous page. - apply to CAD. - write chapter synopsis. - participate in VICA meeting.	Continued from previous page. - construct a numberline, place zero in the middle, and mark off each increment on both sides. - demonstrate how tolerances (upper/lower limit) are signed numbers. - cut out pictures of positive and negative numbers in use in society. - write a paragraph explaining how signed numbers are used in drafting and computers. - work problems at board. - work problems at computer with Jhm or compatible software. - give examples of congruence. - label numerous angles, lines and triangles by types. - construct parallel lines. - identify what parallel lines are used to represent in drafting.	Continued explain positive and negative numbers and give an example of how we use them in daily life. add directed numbers on number line. add signed numbers without a numberline. identify intersecting lines, parallel lines, transversals, interior angles, corresponding angles identify types of triangles by sides or angles. define congruence. use postulates to prove triangles congruent.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
SHEET METAL/DEVELOPMENTS Continued		Continued from previous page. - construct intersecting parallel lines, then measure all angles - define relationship between angles and make up a theorum. - identify cardboard triangles as to types. - construct pairs of congruent triangles by side, side, side, postulate; side, angle, side postulate; and angle, side, angle postulate. - pair up congruent cardboard triangles by using a ruler and protractor, when given numerous assorted triangles. - identify congruent triangles on a drafting drawing.	

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
ASSEMBLY DRAWINGS Time Allotment: Days 35-45 Upon completion of the unit, the students should be able to: demonstrate an understanding of assembly drawings, their various types, related numbering systems and associated bills of material. describe the function of an assembly drawing. describe the kinds of dimensions required on specific types of assembly drawings. sketch layout of assigned assembly. select required scale and medium and plan space. draw assigned assembly. identify parts with balcons and leaders.	Students will: - review and understand purposes of assembly drawings. - identify types of assembly drawings. - assign the dimension requirements. - review and describe content and form of parts. - attach lists and bills of material. - demonstrate application of balloon identification. - sketch assembly drawings in section. - assign the numbering systems on assemblies. - apply to CAD. - take test for definitions and functions. - become familiar with content of parts lists on assembly.	Students will: - review vocabulary. - work addition and subtraction of signed numbers and terms at board. - solve addition and subtraction of terms at computer. - plot variable on single and dual axis graph. - review 3A Chapter 14 in drafting text (rectilinear graph) and plot a series of binomial variables. - using two sets of data (ordered pairs) to organize data into x and y coordinates and plot a line on a graph. - using a graph, compose a set of ordered pairs.	Upon completion of the unit, the students should be able to: know and use vocabulary associated with this unit. subtract signed numbers. add and subtract terms. plot variables on a single axis graph (x). plot variables on a x, y axis graph. take test on content.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
ASSEMBLY DRAWINGS Continued	Continued from previous page.	Continued from previous page.	Continued.
construct parts list.	- write chapter synopsis.	- construct rhombus, square and rectangle.	identify types of parallelograms.
assign part numbers.	- review for quarter exam.	- find perimeter and area of each figure.	
draw main and sub-assembly.	- participate in VICA meeting.	- identify those shapes on the drafting drawing.	
		- review for quarter test.	
		- take quarter test.	

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
STRUCTURAL DRAFTING Time Allotment: Days 46-55 Upon completion of the unit, the students should be able to: have a general understanding of structural steel components, methods of drawing presentation, connection techniques, and use of stock handbooks. calculate the weights of selected steel members. be familiar with standard steel component designations. describe function of a structural drafter. define structural terms. read text with information on structural drafting. draw floor framing plan and label.	Students will: - read chapter information. - define structural drafting. - discuss steel skeleton structure. - define standard structural steel members and terms. - explain steel member labeling methods. - calculate weight of members and assemblies. - discuss structural steel beam/column identification. - coordinate systems. - examine samples of structural drawings. - discuss methods of connecting steel members. - prepare bills of material. - draw and label dimension steel truss. - draw detail of beam with rivet holes. - draw structural assembly with bill of material.	Students will: - know and use vocabulary associated with the unit. - work multiplication and division of signed numbers at board. - work multiplication and division of signed numbers at computer. - view list of terms and identify coefficient variable, exponent and sign. - select some monomial formula from drafting and identify the coefficient, variable and exponent. - make up formulas to find the weight of selected steel members. - make up a formula to determine how many steel beams are necessary to support a predetermined amount of weight.	Upon completion of the unit, the students should be able to: know and use all vocabulary associated with this unit. multiply and divide signed numbers. multiply terms. raise signed numbers to a given power or exponent. raise a term to a power.

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
STRUCTURAL DRAFTING Continued draw standard steel shapes and label with symbols. dimension a framing plan. calculate the weight of a frame or structural assembly.	Continued from previous page. - take test for definitions, knowledge of labeling and weight calculations. - apply to CAD. - write chapter synopsis. - participate in the VICA meeting.	Continued from previous page. - multiply the area formula of the rectangle and square by 5 (or any other number) to determine the area of 5 identical rectangles or squares. - write a monomial formula by selecting one item from the bill of materials list (quantity of the item must be more than one). - write a formula to determine cost (i.e. IB=I-beams at $105.00 apiece) - 14 items 14 I =$1470 (i.e. I = I beams at $105.00 each, 14 I beams used in the list. 14 I = $1,470.00. - pass a test covering the content area.	

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
STRUCTURAL DRAFTING Continued	Continued from previous page.	Continued from previous page - write definitions to the vocabulary in their own words. - locate circles, chords, secants on drafting drawings. - compute area of circle problems when given diameter, circumference or radius at blackboard. - measure circumference of numerous circles along with diameter-then divide circumference by diameter to "discover" Pi (π). - compute areas of circles on drafting drawings. - construct a circle to fill a certain square area. - demonstrate that tangents to a circle from a point outside the circle are equal. - demonstrate that a radius drawn to a line, tangent to the circle is perpendicular to the tangent. - construct a right triangle in a circle using the above theorem.	Continued define a circle, secant, chord, radius, diameter. construct a circle of a given radius or diameter. compute the square area and circumference of a circle. understand relationships between a chord and a circle.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
PIPING DRAFTING Time Allotment: Days 56-65 Upon completion of the unit, the students should be able to: draw double line and single line schematic arrangements in both orthographic and isometric presentations. define piping drafting. list kinds of pipe. list kinds of joints, fittings, connections. draw schematic symbols of fillings and valves. draw orthographic piping system. draw isometric piping system.	Students will: - read piping chapter. - sketch types of pipe fittings into notebook. - define types of valves and functions. - list types of pipe and joints. - discuss pipethreads and specifications. - draw double line system, dimension and label. - draw single line system, dimension and label. - review pipe support and hanger methods. - draw isometric single line system and label. - develop piping library on CAD system and create single line piping. - draw flow chart. - test for theory information. - write chapter synopsis. - conduct a VICA meeting.	Students will: - review vocabulary. - identify monomials and polynomials from a list. - explain difference between monomial and polynomials. - substitute values for the literals and work the expression. - identify formulas which are polynomials. - compose a formula that is a polynomial from an architectual drawing (i.e. room perimeter $2L + 2W =$) - discuss what application it has (i.e. to find numbers of feet needed to baseboard a room) - add polynomials at board. - subtract polynominals at board - pass a test covering content area.	Upon completion of the unit, the students should be able to: know and use vocabulary associated with the unit. add and subtract polynomials. add and subtract a monomial to a polynomial.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
PIPING DRAFTING Continued	Continued from previous page.	Continued from previous page. - discuss concept of similar circles and how they apply to gear ratios. - determine the gear ratios of gears and pulleys from actual drafting drawings. - construct triangles and polygons inside circles. - use corollaries and theorems to solve for missing angles. - use drafting drawings to solve for missing angles. - construct concurrent lines within triangles to demonstrate bisectors of angles. Intersect at a point equidistant from the three sides.	Continued. understand concept of similar circles. understand inscribed angles and use corollaries to solve for unknown angles. construct geometeric figures within circles. define and construct concurrent lines.

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
SENIOR ARCHITECTURE Time Allotment: Days 66-90 Upon completion of the unit, the students should be able to: review first year architectural basics. list the types of drawings included in a set of house plans. list the considerations made before planning a house. discuss cost estimates in house construction. draw floor plan using space parameters assigned. draw complete set of house plans.	Students will: - review architectural history. - review architectural lettering styles. - review dimensioning techniques. - review architectural chapter. - plan a house, considering the following: ...surveying as part of architectural planning ...elevations, sections, floor plans ...roof pitch ...standard lumber designations, nominal and actual sizes ...insulation ...solar design ...passive and active solar systems ...perspectives ...use CAD symbol library to create a floor plan	Students will: - review and learn vocabulary associated with the unit. - work problems at board. - demonstrate techniques of foil system and multiplication by working problems side by side. - review. - select a formula at random. - identify it as a monomial or polynomial. - explain how working the formula is the same as substituting values in polynomials/monomials. - identify square and cube monomials. - create a polynomial by combining two formulas together (i.e. square area LW x L'W') - multiply to compute surface area of the walls of a room to be painted.	Upon completion of the unit, the students should be able to: multiply monomials by a number or another monomial. square or cube a monomial. multiply a polynomial by a number or monomial. multiply a polynomial by a polynomial. use the FOIL system collect like terms. substitute a value for the unknowns and reduce the polynomial to one number.

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
	Continued from previous page.	Continued from previous page.	Continued.
SENIOR ARCHITECTURE Continued	- take test for architectural theory. - write chapter synopsis. - participate in VICA meetings (2).	- identify monomials, polynomial expressions and equations. - work equations at board. - work equations at computer. - create an equation from a bill of materials. - create an equation from photographs or pictures from the drafting profession. - review steps in solving a one variable equation in one or two steps. - review substitution of values to insure correctness of answers. - learn steps in balancing an equation when applying an operation. - learn to apply universal operations to reduce a simultaneous equation to one unknown.	understand differences between monomials, polynomials and equations. determine proper universe operation and perform algorithms to isolate variables. understand concept of keeping equations balanced. solve a one variable equation in one and two steps. substitute values to check accuracy. understand difference between linear equations and simple equations. understand the concepts of inverse operations. know when and how to apply inverse operations

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
SENIOR ARCHITECTURE Continued	Continued from previous page.	Continued from previous page.	Continued.
		- review names of regular polygon and point out their shapes from a sheet of assorted polygons.	solve simple simultaneous equations with two polynomial equations.
		- construct each regular polygon on a sheet of paper.	reduce simple linear equations of two variables to one variable and solve for its value.
		- measure perimeter and area of each polygon.	
		- inscribe regular polygons within a circle.	substitute value of first variable into original equation to solve for value of second unknown.
		- construct a ten-foot radius with pegs and string.	
		- discuss the difference altitude makes in transforming a parallelogram into a prism.	compute area and perimeter of polygons from a triangle to a decagon.
		- construct and label types of prism.	construct polygons from a triangle to a decagon.
		- compare formulas for square area of parallelograms and volume for prisms.	know and use formula for solving interior angles.
		- draw a pattern for any prism and cut it out and assemble.	identify cubes and computer.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
SENIOR ARCHITECTURE Continued	Continued from previous page.	Continued from previous page. - draw a pattern for a right cylinder and cut it out and assemble. - measure angles of prisms and cubes. - use the formulas to compute square area and volume at blackboard. - select prisms and cylinders from drafting drawings and compute area and volumes. - find volume and area of objects that are prisms and cylinders. - review for quarter exam and/or semester exam. - pass quarter test and semester exam.	Continued. identify types of prisms and compute area and volume. identify cylinders and cones and compute area and volume.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
WELDING DRAWING Time Allotment: Days 91-103 Upon completion of the unit, the students should be able to: discuss the function of welding and its applications. compare weldments to castings and forging. list the kinds of welding processes. identify the types of welded joints. describe a complete welding symbol. designate appropriate symbols on a working drawing. convert a casting to a weldment showing appropriate symbols. make a welded assembly drawing with parts list.	Students will: - read welding chapter information. - define welding. - review welding processes. - compare weldments and castings. - list the advantages of low volume weldments vs. casting. - identify basic welding joints and choice of application. - designate welding symbols, placement and descriptive information: ...converting a casting to a weldment ...sketch symbols and designations into notebook ...create a welding library on the CAD system and apply to computer-generated drawing - write chapter synopsis. - take test for terms, processes, application.	Students will: review vocabulary. review functions of x and y. learn to set up a function machine. set up and number a set of coordinate axis on graph paper. practice locating coordinates on the graph. graph two variable functions. learn to calculate the slope of the line. review pg. 452-454 in drafting text and explanation by math teacher. set up a numbered pair of coordinates on graph paper in ink or dark pencil. Note: Teacher will use Xerox to make acetate copy (clear). Then students will lay axes on top of a drafting drawing, lining up origin with a predetermined point and compute the slope of the line (pg. 453,	Upon completion of the unit, the students should be able to: know and use vocabulary associated with unit graph, an equation with two variables. understand and locate coordinates. number a set of coordinate axes. locate a range with unequalities. compute the slope of the line. formulate a graph from data.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
WELDING DRAWING Continued	Continued from previous page. - participate in the VICA meetings.	Continued from previous page. method of selected points). - graph an inequality and shade in a range. - define tolerances as inequality on one and two axes. - shade the out-of-tolerance zone. - choose two of the tables from pg. 462-465 and set up a graph. - plot own grades upon a graph. - construct geometric forms when given coordinates by teacher. - list the coordinates of the vertices of angles of geometric figures. - compute square area then verify by counting squares. - compute lengths by using distance formula at blackboard - discuss the use of coordinate geometry in drafting.	Continued. graph geometric figures from coordinates. list coordinates of a geometric figure drawn on a graph. use the distance formula to construct geometric figures on graphs.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
TECHNICAL ILLUSTRATION Time Allotment: Days 104-115 Upon completion of the unit, the students should be able to: present an overview of the work performed by the industries using technical illustrators. apply the knowledge of pictorial drawings to the artistic principles of technical illustration. review axonometric projections. define technical illustration and the varying types. discuss differences between pictorial drawings and technical illustrations. draw assigned pictorials as illustrations. draw assigned explored pictorials as technical illustrations.	Students will: - differentiate types of axonometric projections. - choose appropriate axonometric. - use sketching in preparation for the illustration. - study pictorial details. - understand pictorial assemblies defined. - draw and study exploded pictorial assemblies. - practice shading techniques. - examine patent drawings. - discuss and use special methods, equipment and materials used in illustrations. - discuss the application of art to the technical illustration. - demonstrate inking techniques in illustration.	Students will: - review all vocabulary. - write a definition of formula using pgs. 108-109 of the math book. - compare and contract formula with equation in one sentence. - pick a topic in drafting and write a simple formula (i.e. I - I beams at $105.00 per foot = formula is $I \cdot 105 \cdot F = T$, I = I beams, F = feet, T = total cost). - review substitution skills. - review pg. 474 and 475 (math text). - discuss orally what the letters represent in each formula. - select a formula for a solid geometric volume. - measure three geometric forms and substitute measurements.	Upon completion of the unit, the students should be able to: know and use vocabulary associated with this unit. interpret a formula and explain what the literal unknown represent. work formulas by inputing data. transform formulas to solve for one variable. use transformation math to solve for one unknown where all other data is given. memorize value of π to two decimal places.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
TECHNICAL ILLUSTRATION Continued discuss inking applications to illustration. ink a simple illustration.	Continued from previous page. - write chapter synopsis. - participate in VICA meeting.	Continued from previous page. - find volume. - learn to transform a formula to isolate an unknown. - rewrite formulas in relation to predetermined unknowns. - solve for missing data. i.e. Rectangle Area = LW A = 30, width = 6 What is the length? $A = LW \quad \left[\frac{A}{W} = L \text{ transformation}\right]$ $\frac{30}{6} = 5 \quad L - 5$ - demonstrate isometrics by reflections of geometric figures. - demonstrate that rotations are isometric. - discuss why reflections and rotations are important to drafting.	Continued. recognize reflections and rotations as they pertain to transformations.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
CHARTS AND GRAPHS Time Allotment: Days 116-125 Upon completion of the unit, the students should be able to: define function of charts and graphs. illustrate types of charts and graphs. interpret basic charts and graphs. sketch graph from data. construct a variety of chart and graph types. use color, paste-up, mechanical lettering, etc., to construct a graph. present graph and data to group.	Students will: - define the functions of charts and graphs. - list advantages of graphs of pure data. - collect for notebook a selection of published charts and graphs. - prepare a line graph, pie chart, bar graph from specific data. - construct a pictorial bar chart. - list materials used to make charts and graphs. - apply color, mechanical letterine, etc. to assigned graph. - present completed chart or graph and related data to group.	Students will: - review vocabulary. - discuss ways of organizing information. - draw line and bar graph from data taken from the mechanical drawing trade. - use one line or equation and plot the line. - plot two and three linear equations. - review angular measurements of a circle and how to find X% of 360°. - create several circle graphs from data. - interpret information on a graph to answer questions. - plot a line graph. - plot averages of the data set in a different color.	Upon completion of the unit, the students should be able to: interpret graphs and charts. name and identify types of graphs and charts. collect raw data and organize into a graph. graph outcomes of formulas or equations. graph percentages.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
CHARTS AND GRAPHS Continued	Continued from previous page.	Continued from previous page. - review sets of raw data and orally explain which graph will best illustrate the information. - draw four different types of graphs to illustrate the same data set. - locate one graph of each type from a magazine or professional journal. - cut it out and mount it on paper. - write a paragraph below explaining the type of graph and the information it contains. - map images from one graph onto another. - review reflections by proving isometrics of geometric figures on a drafting drawing. - perform dilations of geometric figures.	Continued. locate images of figures by mapping. recognize dilation.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
GEARS Time Allotment: Days 126-135 Upon completion of the unit, the students should be able to: describe the function of a cam. describe the types of cams. explain the types of motion produced by cams. describe the function of a gear. define basic gear forms. discuss gear nonmenclature. draw a spurgear system, bevel gear system. draw types of cams.	Students will: - read and summarize chapter information on cams and gears. - identify and sketch basic gearforms. - define gear tooth nomenclature in notebook. - explain how basic gear systems work. - discuss gear materials. - list types of cams. - take test for gear forms and nomenclature, cam types and kinds of produced motion. - write chapter synopsis. - participate in the VICA meeting.	Students will: - review words and meanings. - review ratios and solve simple ratios. - review formulas for triangles. - review similar triangles. - work measurement problems involving triangles at board. - find a distance from a point in the parking lot running diagonally through the school. - measure off base and one side of triangle (using 100' tape) - use similar triangles to compute distance. - review method of determining square root with calculator. - use graph paper and lay out five right triangles. - measure all sides.	Upon completion of the unit, the students should be able to: know and use vocabulary associated with the unit. use ratios to determine indirect measurement. know the pythagorean theorm and its formula. understand the ratios in a 30° - 60° triangle and the 45° triangle. know and use Hero's formula for area of a triangle.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
		Continued from previous page.	
GEARS - Continued		- determine relationship of hypotenuse to other sides. - discover pythagorean theory. - learn how to use right triangles to measure indirect distances. - work problems at board. - measure height of nearby buildings. - try out triangles in parking lot or football field. - rotate to triangles of other students layout and measure sides. - use Hero's formula to calculate area. - measure altitude and calculate area. - figure percentage of error. - review for quarter exam; quarter test.	

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
FUNDAMENTALS OF DESIGN Time Allotment: Days 136-165 Upon completion of the unit, the students should be able to: understand the principles and processes of design. apply basic design principles to a simple idea. follow the design process to completion. describe the work of a designer. define "design" define "creativity" discuss good vs. poor design in selected products. describe the design process.	Students will: - discuss the designer's function and the concept of design. - discuss the process of being creative. - define brainstorming. - make a list of good and poor design characteristics in selected products. - discuss safety considerations in new design. - review invention and patent drawings. - brainstorm a list of future products. - discuss principles of problem solving and the scientific method. - discuss aesthetics in design.	Students will: - review vocabulary. - be introduced to concept of how they are derived. - locate sine, cosine and tangent for a given angle (without interpolation). - learn how to interpolate. - locate sine, cosine and tangent for a given angle (with interpolation). - find the angle corresponding to the value in the table when given the sine, cosine and tangent. - work formulas that have sines, cosines and tangents in them. - learn how to use a calculator that has these functions included in its capability. - pass a test covering the content area.	Upon completion of the unit, the students should be able to: know vocabulary associated with the unit. read words sine, cosine, tangent. read a table of sine, cosine and tangent. interpolate the values. use the values in solving formulas.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
FUNDAMENTALS OF DESIGN Continued prepare preliminary sketches for simple device. prepare completed details and an assembly of simple device.	Continued from previous page. - define new terms in a notebook. - take test for mastery of terms and processes. - write chapter synopsis. - participate in the VICA meeting.		

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
ELECTRONIC AND ELECTRICAL Time Allotment: Days 156-165 Upon completion of the unit, the students should be able to: recognize the rudiments of electronic drafting. understand electrical symbols, schematic diagrams, and printed circuits. define electrical and electronics drafting. describe the function of an electronics drafter. list basic elements of an electrical circuit. discuss Ohms Law. identify electrical symbols. draw assigned schematics. draw electrical plan for house.	Students will: - read and summarize chapter on electrical and electronics drafting. - record standard electrical symbols in notebook. - discuss the need for electronics drafters. - define electrical energy and principles. - discuss varying types of electronics drawing. - create electronic symbol library on CAD system. - create a schematic using CAD system. - write chapter synopsis. - take test for symbols. - participate in the VICA meeting.	Students will: - review relationship of sides to angles in triangles (sine = side opposite / hypotenuse) - solve for missing angle or side when given triangles with partial information. - construct several triangles. - measure sides and angles. - label only parts and then let another student solve for missing information. - verify answers. - solve problems of indirect measurement using triangles. - use an architectual drawing (with angle of rafter and horizontal missing) and supply angles of rafters to horizontal using tangents. (Note: Demonstration problem 29-5, pg. 420) - measure distance outside using trigonometry functions. - pass test covering content area.	Upon completion of the unit, the students should be able to: use sine, cosine and tangents to solve problems in triangles. use sine, cosine and tangents to solve problems of measurements.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
MAP DRAFTING AND SURVEYING Time Allotment: Days 166-175 Upon completion of the unit, the students should be able to: recognize the inter-relationship of map drafting and surveying. discuss land survey and plot plans. define mapping terms and symbols. sketch a level transit and label parts. demonstrate the use of a level transit. collect field data on assigned plot. draw plot plan using collected data.	Students will: - read and summarize text information in the notebook. - define mapping and surveying. - discuss terms and define types of plots. - discuss the function of the map drafter. - discuss the relationship between the survey and the architectural plot plan. - sketch mapping symbols. - interpret directional and length information on survey or plot plan. - sketch level transit and label. - collect field data using transit. - discuss mapping and surveying scales. - take test on terms, interpretation of plat data. - apply to CAD.	Students will: - review vocabulary. - review exponents. - raise numbers to powers. - express numbers in scientific notation. - express numbers in scientific notation in regular place value form. - calculate the log of numbers using tables and calculators. - calculate the antilog by using tables or a calculator. - use logs in formulas. - multiply and divide logs. - use practical application problems with logs. - pass a test covering content area.	Upon completion of the unit, the students should be able to: know and use vocabulary associated with the unit. raise a base number to a power. write a number in scientific notation. locate the mantissa for a number interpolate. determine the characteristics. find the antilog of a number. use a log table to locate values. use a calculator with log/antilog functions.

APPLIED MATHEMATICS: DRAFTING II

OBJECTIVES AND ACTIVITIES

Vocational Student Objectives	Vocational Student Activities	Academic Student Activities	Academic Student Objectives
SENIOR PORTFOLIO/EXIT PREPARATION Time Allotment: Days 176-180 Upon completion of the unit, the students should be able to: create a drawing portfolio representative of the variety of drafting and CAD work performed in the senior year. gather samples of drawings completed during the senior year. revise existing drawing and correct errors. get instructor evaluation/ approval of selected portfolio drawings. reproduce original drawings. correct CAD storage file disks. plot selected CAD samples. bind in appropriate folder.	Students will: - collect existing drawing samples and evaluate quality. - revise and/or redraw selected drawing samples. - examine sample portfolios. - consider reduction of samples for aesthetic presentation. - correct CAD storage disks. - redraw CAD assignments. - choose appropriate CAD plot size and plot for hard copy. - select binding or appropriate presentation.	Students will: - review problems for final exam at board and computer. - take final exam.	Upon completion of the unit, the students should be able to: pass successfully final exam.

REFERENCES

Drafting Text

Engineering Drawing and Graphic Technology

French, Uierck, Foster, 1986

Current Mater Text

Practical Mathematics

Palmer, Mrachek, 1986

APPENDIX

STUDENT PROFILE

Name of Student _____

Homeroom _____

Vocational Program _____

Vocational Teacher _____

Address of Student _____

_____

Phone _____

Name of parent or guardian _____

Number where parent or guardian can be reached during the day _____

Name of support persons outside school environment and Phone Number (if applicable)

_____

Date entered vocational program _____

Date completed program _____

Days absent --Quarter 1_____Quarter 2_____Quarter 3_____Quarter 4_____

Quarter 5_____Quarter 6_____Quarter 7_____Quarter 8_____

Reading score -- entry to program _____exit _____ test used _____

English score -- entry to program _____exit _____ test used _____

Mathematics score -- entry to program _____ exit _____ test used _____

Marks in Vocational Program

Quarter 1	Quarter 2	Quarter 3	Quarter 4
_____	_____	_____	_____
Quarter 5	**Quarter 6**	**Quarter 7**	**Quarter 8**
_____	_____	_____	_____

Marks in other courses

Course _____Quarter 1___Quarter 2___Quarter 3___Quarter 4___

Course _____Quarter 1___Quarter 2___Quarter 3___Quarter 4___

Course _____Quarter 1___Quarter 2___Quarter 3___Quarter 4___

Course _____Quarter 1___Quarter 2___Quarter 3___Quarter 4___

Course _____Quarter 1___Quarter 2___Quarter 3___Quarter 4___

Course _____Quarter 1___Quarter 2___Quarter 3___Quarter 4___

Applied Academics - English and Mathematics

Parts I, II, IV, and V of this form are to be completed by the vocational teacher who will then give copies of this form to the reading and mathematics teachers before the unit is taught. The reading teacher completes Part III. Only one form is needed per unit regardless of the number of students involved.

Names of students _____

_____

_____

_____

Vocational Program
Unit _____

I. Vocabulary

Technical _____

_____

_____

_____

Non-Technical _____

_____

_____

_____

II. Assigned reading _____ pages _____

III. Reading Skills/
English Skills _____

_____

_____

_____

IV. Types of writing involved in this unit

_____

_____

_____

_____

V. Mathematics involved in this unit

_____

_____

_____

_____

VI. Special Considerations:

GROUP WORK RATING FORM, VOCATIONAL CLASS

4 - Always 3 - Most of the Time 2 - Sometimes 1 - Never

TASK	Term 1	Term 2	Term 3	Term 4	
finishes study guide (or other work) independently before joining group					
has necessary materials (guide, book, pencil, etc.)					
sticks to the subject					
participates in group discussion by asking the opinions of others					
listens when other group members are talking					
is courteous to other group members - avoids personal attacks					
willingly helps other group members					
uses time wisely					
follows directions carefully					

Total Score: _____ Teacher _____

M. Lynne Smith, Content Reading Manual
Cincinnati City Schools

TEACHER'S EVALUATION OF STUDENT - AFFECTIVE DOMAIN

Name of Student _____

Name of evaluating teacher _____

Date _____Term _____

Applied Academics teachers are to evaluate stuents in the following categories at the end of each term. The rating is to be written in the blank space in the "Rating" column.

	Excellent 5	4	3	2	Poor 1	Rating
1. Follows directions						_____
2. Takes responsibility						_____
3. Cooperates with peers						_____
4. Responds positively to criticism						_____
5. Cooperates with superiors						_____
6. Takes the initiative						_____
7. Manages time well						_____
8. Persists until task is accomplished						_____
9. Is open to new ideas						_____
10. Is organized						_____

Note: During the term, conference teachers will discuss their ratings and come to a consensus on each one. The score recorded on the Applied Academics Evaluation Form is an average rating, that is, the consensus ratings are added and the total is divided by ten. (number of item)

ESTES ATTITUDE SCALE

Date _____ Name _____

Directions: Respond to each item below in terms of A (strongly agree), B (agree), C (undecided), D (disagree), or E (strongly disagree). The scale is repeated here.

Circle the letter indicating your feeling.

A - Strongly Agree B -Agree
C - Undecided D -Disagree
E - Strongly Disagree

A B C D E 1. Reading is for learning but not for enjoyment.

A B C D E 2. Money spent on books is well spent.

A B C D E 3. There is nothing to be gained from reading books.

A B C D E 4. Books are a bore.

A B C D E 5. Reading is a good way to spend spare time.

A B C D E 6. Sharing books in class is a waste of time.

A B C D E 7. Reading turns me on.

A B C D E 8. Reading is only for grade grabbers.

A B C D E 9. Books aren't usually good enough to finish.

A B C D E 10. Reading is rewarding to me.

A B C D E 11. Reading becomes boring after about an hour.

A B C D E 12. Most books are too long and dull.

A B C D E 13. Free reading doesn't teach anything.

A B C D E 14. There should be more time for free reading during the school day.

A B C D E 15. There are many books which I hope to read.

A B C D E 16. Books should not be read except for class requirements.

A B C D E 17. Reading is something I can do without.

A B C D E 18. A certain amount of summer vacation should be set aside for reading.

A B C D E 19. Books make good presents.

A B C D E 20. Reading is dull.

SCORING DATE_____

Positive items: Nos. 2, 5, 7, 10, 14, 15, 18, 19
Negative items: Nos. 1, 3, 4, 6, 8, 9, 11, 12, 13, 16, 17, 20

Check the response values for the answers. Record them on the answer sheet.
If "C" was marked for #1, the score would be 3; "A" for #2 would be a score of 5, etc.
Then total the score.

		A	B	C	D	E
A B C D E	1.	1	2	3	4	5
A B C D E	2.	5	4	3	2	1
A B C D E	3.	1	2	3	4	5
A B C D E	4.	1	2	3	4	5
A B C D E	5.	5	4	3	2	1
A B C D E	6.	1	2	3	4	5
A B C D E	7.	5	4	3	2	1
A B C D E	8.	1	2	3	4	5
A B C D E	9.	1	2	3	4	5
A B C D E	10.	5	4	3	2	1
A B C D E	11.	1	2	3	4	5
A B C D E	12.	1	2	3	4	5
A B C D E	13.	1	2	3	4	5
A B C D E	14.	5	4	3	2	1
A B C D E	15.	5	4	3	2	1
A B C D E	16.	1	2	3	4	5
A B C D E	17.	1	2	3	4	5
A B C D E	18.	5	4	3	2	1
A B C D E	19.	5	4	3	2	1
A B C D E	20.	1	2	3	4	5

SANDERS ATTITUDE SCALE

A means "I strongly agree"
B means "I agree"
C means "I'm undecided"
D means "I disagree"
E means "I strongly disagree"

		A	B	C	D	E
1.	Teachers expect their students to fail.					
2.	Teachers respect their students' opinions.					
3.	Teachers don't understand what their students need					
4.	Teachers are good listeners.					
5.	Grades show how much a student has really learned.					
6.	Students' answers are usually wrong.					
7.	Teachers encourage students to share ideas with each other					
8.	Students must accept their teachers' opinions					
.9.	Teachers help their students to succeed.					
10.	Class discussions are a waste of time.					
11.	It is okay to be wrong.					
12.	Most tests are unfair.					
13.	Teachers want to know what their students believe					
14.	It is difficult to succeed in school.					
15.	Teachers encourage students to think for themselves.					

SANDERS ATTITUDE SCALE

Scoring

	A	B	C	D	E
1.	1	2	3	4	5
2.	5	4	3	2	1
3.	1	2	3	4	5
4.	5	4	3	2	1
5.	5	4	3	2	1
6.	1	2	3	4	5
7.	5	4	3	2	1
8.	1	2	3	4	5
9.	5	4	3	2	1
10.	1	2	3	4	5
11.	5	4	3	2	1
12.	1	2	3	4	5
13.	5	4	3	2	1
14.	1	2	3	4	5
15.	5	4	3	2	1

Total Score: _____

Mean Score: _____

The Sanders Attitude Scale is reprinted by permission of the author, Peter L.Sanders.

APPLIED ACADEMICS

EVALUATION FORM

1. Student's Name _____

2. Vocational Program _____ School _____

3. Standardized reading scores

   Stanford Test of Academic Skills - Level 1

   Composite score -- Pre _____ date _____

   Post _____ date _____

   Change _____ date _____

4. Standardized English scores

   Stanford Test of Academic Skills - Level 1

   Composite score -- Pre _____ date _____

   Post _____ date _____

   Change _____ date _____

5. Standardized Mathematics scores

   Stanford Test of Academic Skills - Level 1

   Composite score -- Pre _____ date _____

   Post _____ date _____

   Change _____ date _____

6. Writing Sample - Mean T-unit length

7. Term grades in vocational program

Last Year		Present Year	
Term 1	_____	Term 1	_____
Term 2	_____	Term 2	_____
Term 3	_____	Term 3	_____
Term 4	_____	Term 4	_____

8. Term grades in language or math units

Last Year		Present Year	
Term 1	_____	Term 1	_____
Term 2	_____	Term 2	_____
Term 3	_____	Term 3	_____
Term 4	_____	Term 4	_____

9. Days absent per term

Last Year	Present Year
Term 1 _____	Term 1 _____
Term 2 _____	Term 2 _____
Term 3 _____	Term 3 _____
Term 4 _____	Term 4 _____

10. Sanders Attitude Scale

Mean score - Pre _____ date _____

Mean score - Post _____date _____

Change _____

11. Estes Attitude Scale (reading)

Mean score - Pre _____ date _____

Mean score - Post _____date _____

Change _____

12. Group Work Rating Form

Scores - Term 1 _____ Term 2 _____Term 3 _____ Term 4 _____

13. Average Rating Form

Evaluation of Student - Affective Domain
(consensus from Vocational and Applied Academics teachers)

Term 1 _____ Term 2 _____ Term 3 _____ Term 4 _____

TASK Retrieval Sheet - Applied Academics Program

Vocational Program _____ Academic Subject _____

Vocational Instructor _____ School _____

Class Period Scheduled _____ Academics Teacher _____

Sub Tests Needed
Communications
English, Vocab. Rdg.
Math
Math & Reading

NAME	GRADE	STUDENT NUMBER	Sub-Test:												Sub-test:											
			Pre-Test				Post-Test				Change				Pre-Test				Post-Test				Change			
			Raw	%	NCE	G.E.	Raw	%	NCE	G.E.	Raw	%	NCE	G.E.	Raw	%	NCE	G.E.	Raw	%	NCE	G.E.	Raw	%	NCE	G.E.
1.																										
2.																										
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A-12
Form E